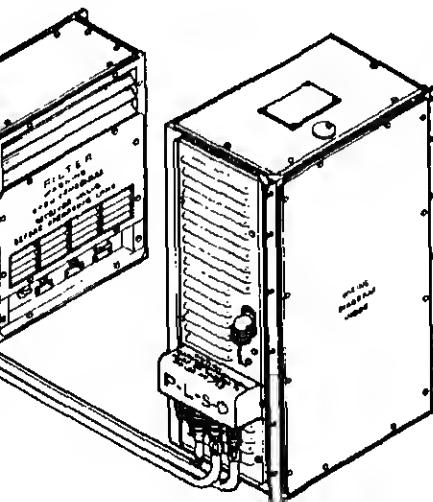


ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

CH
AP

IONER: WALL OR BASE MOUNTED,
, MULTI-PACKAGE, STANDARD WEIGHT,
LED, 6,000 BTU/HR COOLING,
BTU/HR HEATING, CLASS 1
LE PHASE, 2-WIRE, 50/60 HERTZ
MODEL CE-6A-60

KECO MODEL F6000-7
NSN 4120-01-066-9677



INTRODUCTION

OPERATING INSTRUCTIONS

OPERATOR'S MAINTENANCE
INSTRUCTIONS

ORGANIZATIONAL
MAINTENANCE INSTRUCTIONS

DIRECT SUPPORT
MAINTENANCE INSTRUCTIONS

REFERENCES

MAINTENANCE
ALLOCATION CHART

EXPENDABLE SUPPLIES

WARNING**HIGH VOLTAGE**

ed in the operation of this equipment
DEATH ON CONTACT
result if personnel fail to observe safety precautions

work on electronic equipment there is another person nearby who is familiar with the operation hazards of the equipment and is competent in administering aid. When the technician is working by operators, he must warn about dangerous areas.

ever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to have dangerous potential. When working inside the equipment, after power has been turned off, always ground every part before touching it.

careful not to contact high-voltage connections of 115 volts ac when installing or operating equipment.

over the nature of the operations, permit, keep one hand away from the equipment to reduce the risk of current flowing through organs of the body.

Operate the equipment with grille, louvers, and covers in place and tightly secured.

Warning: Do not be misled by the "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

doors, such as during a welding operation nearby, you should take care to ventilate the area thoroughly. An exhaust system like that of a paint spray booth should be used.

Air-supplied respirators, approved by the National Institute for Occupational Safety and Health or the US Bureau of Mines, should be used for all welding in confined spaces and in places where ventilation is inadequate.

Persons who have chronic or recurrent respiratory conditions, including allergies and asthma, should not work in this area.

WARNING

Clean parts in a well-ventilated area.

Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly.

Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property.

Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 50°C).

Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1 kg/cm²).

WARNING**REFRIGERANT UNDER PRESSURE**

is used in the operation of this equipment.
DEATH

WARNING**DANGEROUS CHEMICALS**

Is used in this equipment
DEATH
or severe damage may result if personnel fail to observe the following precautions.

Use great care to avoid contact with liquid refrigerant or refrigerant being discharged under pressure. Sudden and irreversible damage can result from fire. Wear thermal protective gloves, a face protector or goggles in a situation where skin-eye-contact is possible.

Prevent contact of refrigerant with flame or hot surfaces. Contact causes the refrigerant to boil down and form carbonyl chloride (phosgene), a highly toxic and explosive gas.

WARNING**EQUIPMENT DAMAGE**

may be caused if unit is operated prior to opening of condenser receiver valve.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. In a well-ventilated area, wear a respirator and keep away from sparks and flames.

WARNING

OPERATOR'S ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

**AIR CONDITIONER: WALL OR BASE MOUNTED,
SELF-CONTAINED, MULTI-PACKAGE, STANDARD WEIGHT,
AIR COOLED, 6,000 BTU/HR. COOLING,
4,000 BTU/HR HEATING, CLASS 1
115 VOLT, SINGLE PHASE, 2-WIRE, 50/60 HERTZ**

REPORTING OF ERRORS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publication) or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Support & Aviation Material Readiness Command, Attn: DRSTS-MTT, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120. A reply will be furnished to you.

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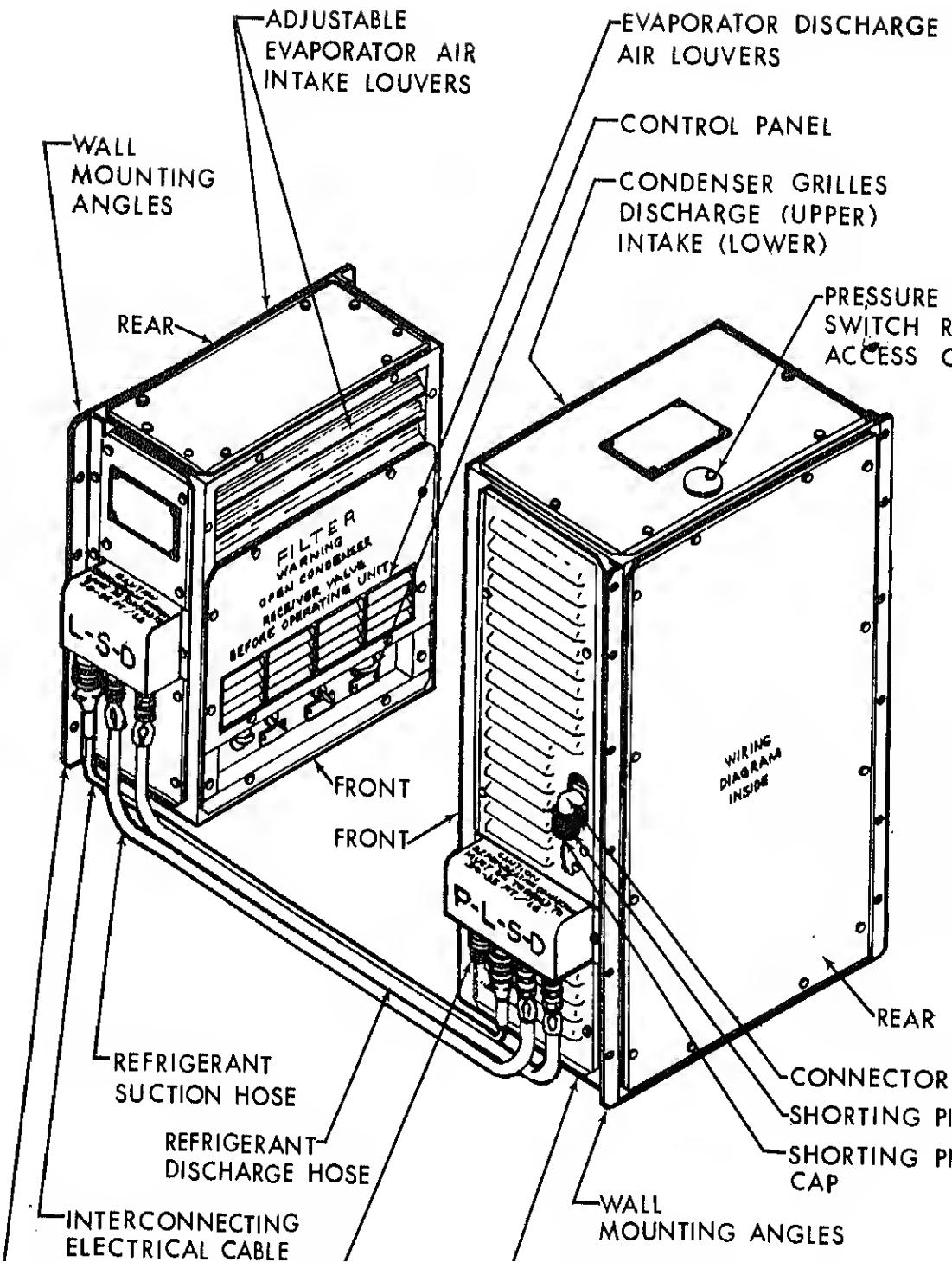
Title

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Section I.

GENERAL INFORMATION

1. SCOPE

This manual contains information on the operation, servicing and maintenance of the Model F6000A contained multi-package, air conditioner (Figure 1-1) manufactured by Keco Industries, Inc., Cincinnati, Ohio. Chapters 1 through 3 comprise operating and servicing instructions for the operator. Chapter 4 comprises maintenance instructions concerning mechanical and electrical components for Organization Maintenance personnel. Chapter 5 provides repair and replacement instructions to be used by Direct Support Maintenance personnel.

The purpose of the air conditioner is to provide cooled or heated air to maintain adequate working temperatures for efficient operation of electronic equipment and for the comfort of operating personnel.

2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed in DA Form 8-750, the Army Maintenance Management System (TAMMS).

HAND RECEIPT MANUAL. Hand receipts for the End Item/Components of End Item COE, and Additional Authorization List (AAL) items are published in a Hand Receipt Manual. The numerical designation is the same as the related Technical Manual with the same number. These manuals are published to aid in proper accountability and are available from the US Army Adjutant General publication Center, ATTN: AGDL-OD, 1655 Wood Avenue, Fort Monmouth, NJ 07704.

3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If your air conditioner needs improvement, let us know. Send us an EIR. You, the user, are the only one who knows what you don't like about your equipment. Let us know why you don't like the design. Tell us how the procedure is hard to perform. Put it on a SF 368 (Quality Deficiency Report). Mail it to us at Commander, DRSTSMEM, 1000 Southall Blvd., St. Louis, Missouri, 63210. We'll send you a reply.

EQUIPMENT DESCRIPTION AND DATA

1-4. PURPOSE OF EQUIPMENT

The F6000-7 Air Conditioner is a multi-package, air cooled, electric motor driven unit. It is designed specifically to provide selected environmental conditioning in air transportable shelters and mobile, van type trailers for efficient operation of electronic equipment and for the comfort of operating personnel.

1-5. CAPABILITIES AND FEATURES

Major Components:

a. Evaporator Section

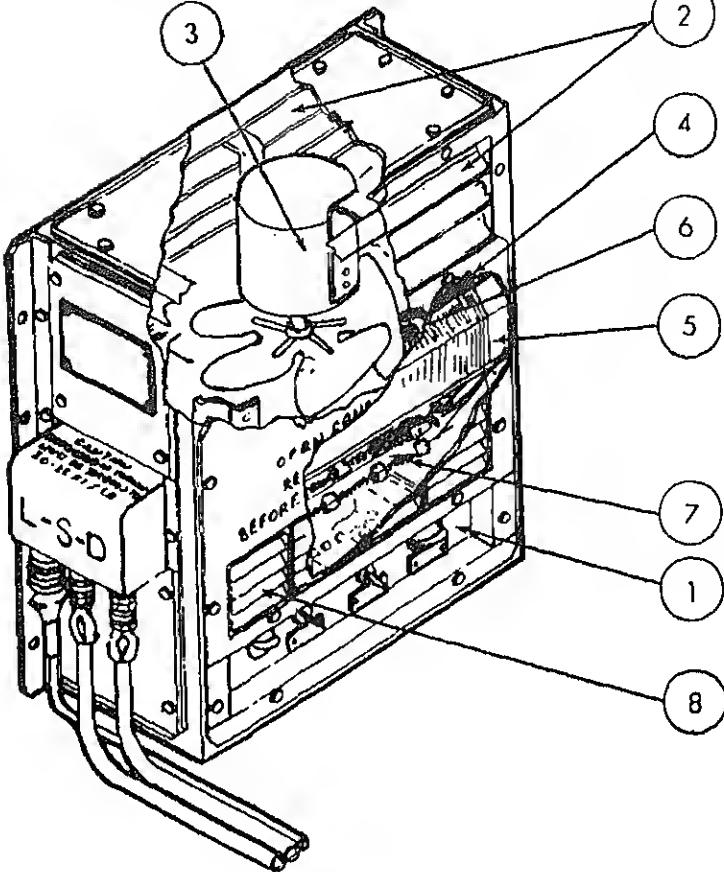
- (1) Control Panel
- (2) Adjustable air intake louvers
- (3) Evaporator fan and motor
- (4) Air filter
- (5) Evaporator coil
- (6) Expansion valve
- (7) Heater coil
- (8) Adjustable discharge air louvers

b. Condenser Section

- (1) Intake air grill
- (2) Discharge air grill
- (3) Intake fixed louver panel
- (4) Condenser fan and motor
- (5) Compressor
- (6) Condenser coil
- (7) Receiver
- (8) Sight glass liquid indicator

c. Interconnecting electrical cabling and refrigerant hoses.

- . Easily air transportable
- . 6000 BTU/HR cooling
- . 4000 BTU/HR heating



CONTROL PANEL (1). Contains the following controls; main power on-off switch, heat-vent-cool, cool thermostatic switch, and the fresh and return air louver control.

ADJUSTABLE AIR INTAKE LOUVERS (2). Allows fresh, return or any combination of air intake. Are mechanically controlled from a knob on the control panel.

EVAPORATOR FAN AND MOTOR (3). Pulls air in thru Intake louvers and blows air across filter coil, and heater coil to discharge air louvers.

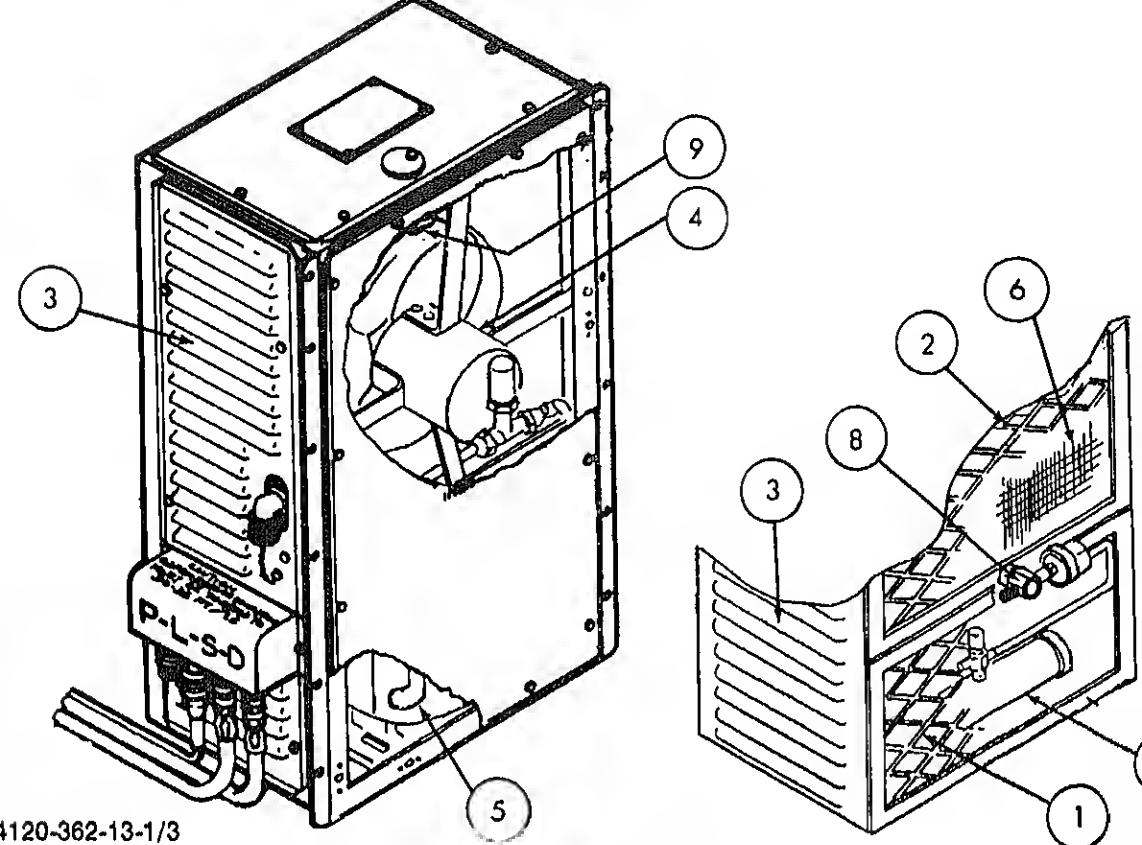
AIR FILTER (4). Removes dust, dirt and other airborne debris from the air.

EVAPORATOR COIL (5). Consists of a copper tube coil and aluminum fin assembly with appropriate flanges. Removes heat from the air by transferring it to the refrigerant.

EXPANSION VALVE (6). Controls refrigerant flow to the evaporator coil.

HEATER COIL (7). Consists of an electric resistance coil used to add heat to the air passing

ADJUSTABLE AIR LOUVERS (8). Directs conditioned air. Pull out and turn to desired direction.



4120-362-13-1/3

TAKE AIR GRILLE (1). Consists of protactiva expandad metal grilla.

CHARGE AIR GRILLE (2). Consists of a protactiva xxpandad matal grilla.

TAKE AIR FIXED LOUVER PANEL (3). Consists of formad shaat matal louvarad panals.

IDENSER FAN AND MOTOR (4). Pulla air In thru Intaka grilla and fixad louvar panels and blows air a dansar coll.

MPRESSOR (5). Consists of a raciprocating compressor drlvan by an alectrio motor harmatioally aaal contalnar.

IDENSER COIL (8). Consists of a copper tuba coll and aluminum fin assambly wth appropriata mou gas. Ramovas haat from tha rafrigarant by transferring It to tha alr.

EIVER (7). Conalsts of a staal contalnar for collecting tha high pressura liquld rafrigarant from tha dansar coll.

HT-GLASS LIQUID INDICATOR (8). Tha condition of tha liquld rafrigarant flowing thru tha syatam ca thru this window whan tha compressor ls oparating In tha cooling moda.

SSURE SWITCH (9). If tha rafrigarant pressura axcaads tha maximum sat point for tha swtch, an alet action ls opened to stop tha compressor. Must ba manually rasat.

Figura 1-3. Condansar Saotion, Location and Dascrlption of Major Componants.

Cooling	60°F (+16°C) to +125°F (+52°C)
Heating	-65°F (-54°C) to +80°F (+27°C)

PERFORMANCE

Cooling Capacity	5800 BTU/HR
Heating Capacity	4000 BTU/HR

WEIGHTS AND DIMENSIONS

Evaporator Section

Height	16 inches (45.72 cm.)
Width	8-1/2 inches (21.59 cm.)
Length	17-5/16 inches (44.3 cm.)
Weight	35 pounds (15.75 kg.)

Condenser Section

Height	26 inches (66 cm.)
Width	9-1/4 inches (23.5 cm.)
Length	17-9/16 inches (44.6 cm.)
Weight	95 pounds (42.75 kg.)
Shipping Weight	140 pounds (62 kg.)

POWER REQUIRED

Voltage	115
Phase	Single
Hertz	50/60

REFRIGERANT

Type	R-12
Charge	2.5 pounds (1.14 kg.)

option and Use of Operator's Controls end tors.....	I	Oparating Instructions on Decals end Instruction Plates.....
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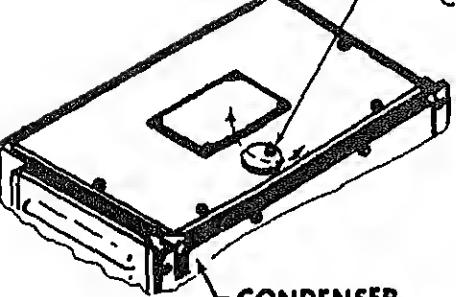
Section I.

DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

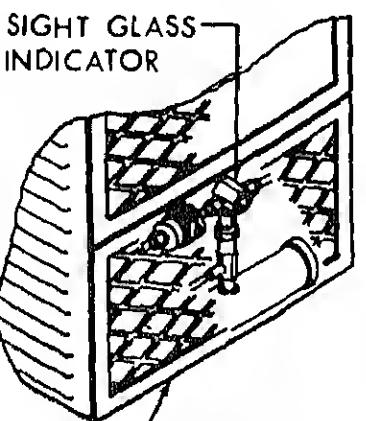
OPERATOR'S CONTROLS AND TECHNICAL PRINCIPLES OF OPERATION

Control Panel. The control panel is located on the evaporator section below the discharge louvers. It contains the following operating controls. See figure 2-1.

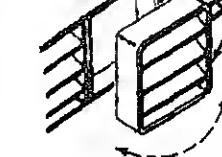
- (1) Switch 1. Switch 1 is marked SW1, FRESH AIR, 0-100% and controls the mixture of fresh and air that is supplied to the evaporator system. It is a mechanical device which acts through a linkage to position the interlocked fresh and return air louvers. Since both louvers operate from a single control, when one is open, the other is closed. Both can be partly open.
- (2) Switch 2. Switch 2 is marked SW2, OFF-ON. This is the unit's main power switch. When set in the off position the components of the air conditioner are inoperative and de-activated. In the ON position the evaporator fan operates and the components of the entire conditioner function in accordance with the settings of switches 3 and 4.
- (3) Switch 3. Switch 3 is marked SW 3, HEAT, VENT, COOL and is the system selector switch. Switch 2 is in the ON position, Switch 3 operates as follows:
 - (a) Set to HEAT, the evaporator fan motor operates and the electric heaters are energized, the return fan and compressor motors do not operate. Note that Switch 4 must be adjusted to a low temperature setting.
 - (b) Set to VENT, the evaporator fan motor operates, but neither heating nor cooling takes place.
 - (c) Set to COOL, when cooling is required, the evaporator fan, condenser fan, and compressor motors operate and the electric heater is deactivated. When the return air temperature is lower than the set point of Switch 4 and no cooling is required, the evaporator fan motor continues to operate. The condenser fan and compressor motors do not operate and the electric heater is deactivated. Note that Switch 4 must be adjusted to a cool temperature setting.



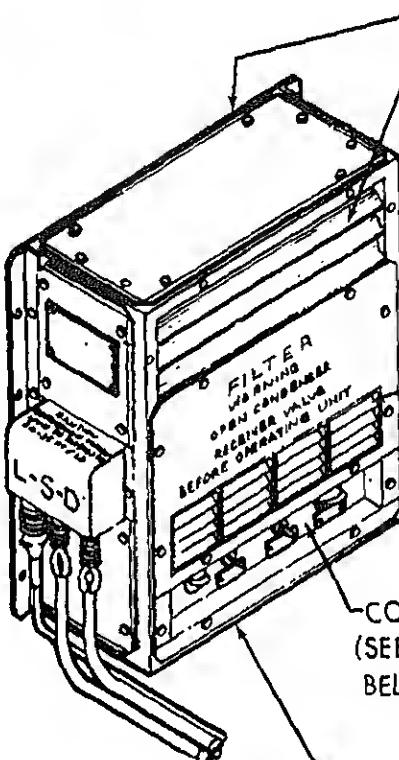
CONDENSER SECTION
UPPER REAR VIEW



CONDENSER SECTION
LOWER FRONT VIEW



DISCHARGE AIR LOUVERS



FRESH AND RETURN
AIR INTAKE LOUVER
ADJUSTED BY
SWITCH 1 ON
CONTROL PANEL

DISCHARGE AIR
LOUVERS
(SEE VIEW ABOVE)

CONTROL PANEL
(SEE ENLARGED VIEW
BELOW)

EVAPORATOR SECTION

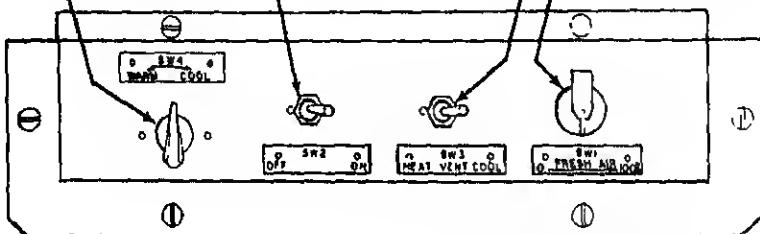
SIGHT GLASS
INDICATOR

SWITCH 4
THERMOSTATIC
TEMPERATURE
CONTROL

SWITCH 2
MAIN POWER
OFF-ON

SWITCH 3
HEAT, VENT, COOL
SYSTEM SELECTOR
SWITCH

SWITCH 1
FRESH AND RETURN
AIR LOUVER
ADJUSTING SWITCH



from liquid to vapor absorbs heat from the air directed over the outside surfaces of the evaporator coil by the evaporator fan, thereby cooling the air. The vaporized refrigerant is piped from the evaporator coil through the shut off valve (V2) to the compressor (B2) where it is compressed and its temperature elevated. The compressed vapor is then piped to the condenser coil (C) where air passes over the outside surface of the coil driven by the condenser fan. The cooler air extracts the heat of evaporation and compression from the refrigerant, recondensing it to a liquid. The liquid flows to the receiver (R) where it is collected under high pressure. Then it flows through the filter-drier (D) and the sight glass (G) to the expansion valve (V1) which meteres the refrigerant into the evaporator coil to repeat the cycle.

) Switch 4. Switch 4 is marked SW4, WARM-COOL end is a thermostatic switch which controls heating and cooling elements of the system. The temperature is maintained, within the limits of unit's capacity, at the switch setting valve. The temperature sensing bulb is attached in the return stream.

Airflow Controls. Airflow is controlled by the proper adjustment of louvers on the evaporator section.

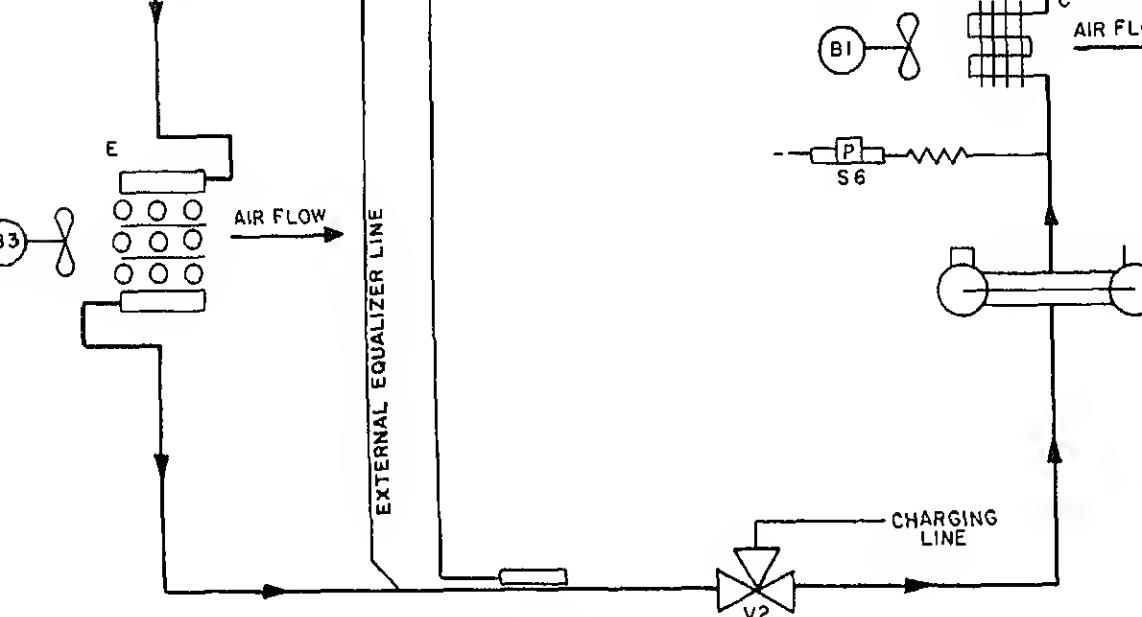
-) Adjustable Evaporator Air Intake Louvers. These louvers are located on the front and back of evaporator section toward the top. If the Installation allows it, fresh air may be supplied to evaporator system as well as return air. SW1 controls the mixture by positioning the Interlocked louvers.
-) Evaporator Discharge Air Louvers. These louvers located above the control panel on the evaporator section are always open. They provide limited control of the direction of airflow. Each of the louver assemblies may be rotated in 90° increments. This is done by first pulling the assembly toward the operator on its spring held retainer, turning it and allowing it to spring back in place. See figure 2-1.

NOTE

Cool air is denser than warm air and tends to sink downward. Therefore, it is usually desirable to direct cool air upward and warm air downward for maximum comfort and coverage.

resettable Automatic Controls. There is one automatic control that can stop the air conditioner. It is a high pressure cutout switch which deenergizes the air conditioner when the condensing pressure reaches 325 ± 10 psig (22.85 ± 0.07 Kgm/Cm 2). It is mounted in the condenser section toward the top. Access is obtained by rotating the pressure switch access cover so that the reset button is exposed. Figure 2-1. Press and release the button to reset the switch. If ineffective, report the trouble to personnel maintenance.

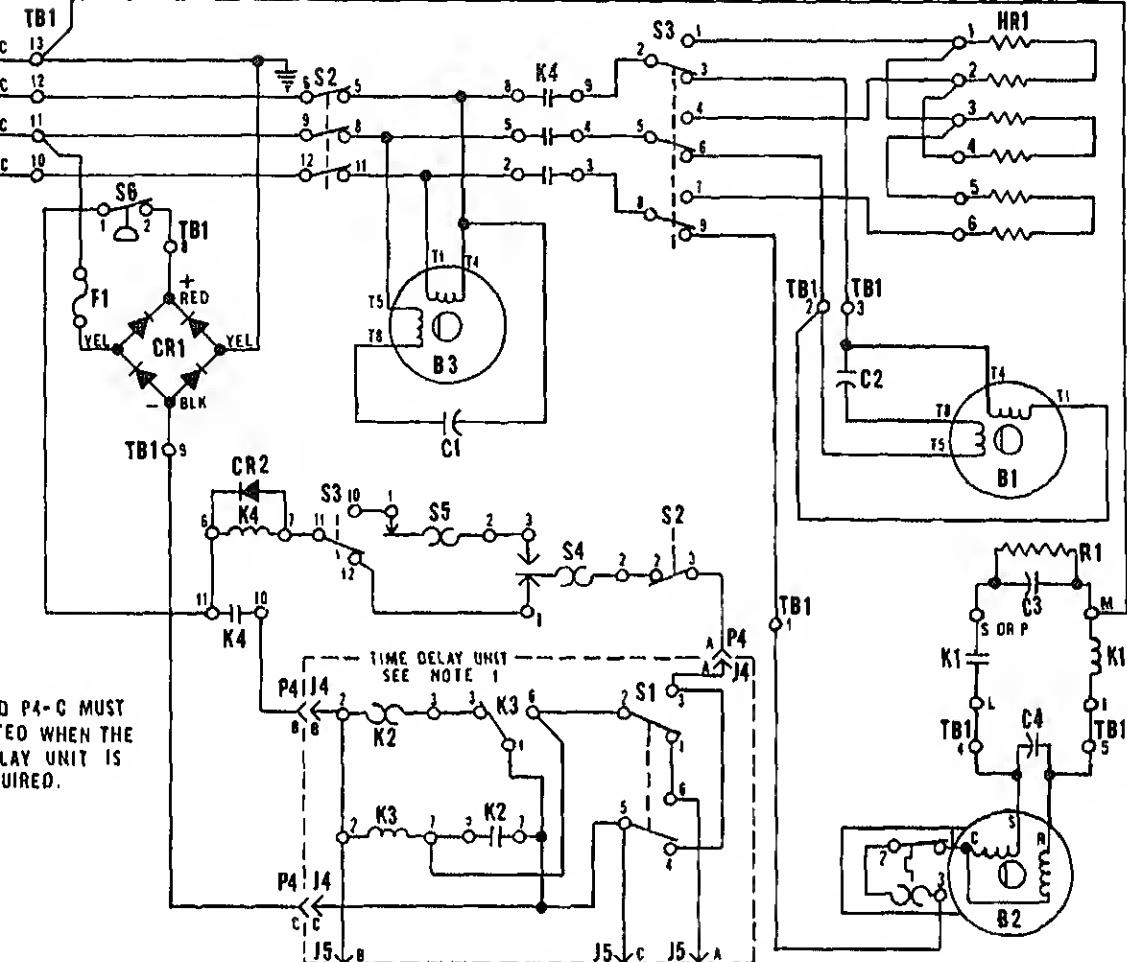
ductor. The sight-glass Indicator Is the only Indicator Incorporated In the air conditioner. See figure 1. This circular window Into the refrigerant liquid shows the condition of the refrigerant and should be Inspected periodically as directed In Table 2-1. The bullseye In the center of the sight glass should be chartreuse green. If chartreuse (yellow-green) or yellow colors are Indicated, the refrigerant contains moisture. If the sight glass shows a milky or bubbly appearance, the refrigerant Is low. Both conditions should be reported to direct support maintenance.



LEGEND	
REF DESIGNATION	DESCRIPTION
B1	FAN MOTOR, CONDENSER
B2	COMPRESSOR
B3	FAN MOTOR, EVAPORATOR
R	RECEIVER WITH OUTLET VALVE AND FUSIBLE PLUG
D	FILTER DRIER
G	SIGHT GLASS
V1	VALVE, EXPANSION
C	COIL, CONDENSER
E	EVAPORATOR
V2	VALVE, LINE SHUT OFF
S6	SWITCH, PRESSURE

TS 4120-362-1

Figure 2-2. Refrigeration Schematic.



CONTROL CIRCUIT SHOWN. UNITS S2 CLOSED, S3
IN COOLING POSITION AND S1 IN POSITION FOR
THIS UNIT TO CONTROL THE SECOND AIR
CONDITIONER

LEGEND

SYM	NAME	SYM	NAME	SYM	NAME	SYM	NAME
B1	MOTOR	F1	FUSE	K3	RELAY	S2	SWITCH, TOGGLE
B2	COMPRESSOR	HRI	COIL, HEATER	K4	RELAY	S3	SWITCH, TOGGLE
B3	MOTOR	J1	CONNECTOR, 90°	P1	CONNECTOR	S4	CONTROL THERMOSTAT
C1	CAPACITOR, MOTOR RUN	J2	CONNECTOR	P2	CONNECTOR	S5	THERMOSTAT
C2	CAPACITOR, MOTOR RUN	J3	CONNECTOR	P3	CONNECTOR	S6	SWITCH PRESSURE
C3	CAPACITOR	J4	CONNECTOR	P4	CONNECTOR	TB1	TERMINAL BOARD
C4	CAPACITOR	J5	CONNECTOR	P5	CONNECTOR	XK2	SOCKET
CR1	RECTIFIER	J7	CONNECTOR	P6	CONNECTOR	XK3	SOCKET
CR2	RECTIFIER JCT. SILICON	K1	RELAY	P7	CONNECTOR	XK4	SOCKET
		K2	RELAY, THERMAL TIME DELAY	P8	SHORTING PLUG		
				S1	SWITCH, TOGGLE		

Preventive maintenance checks and services are required to keep the air conditioner operating efficiently to prevent damage caused by neglect. Table 2-1 contains the listing of periodic checks and services required.

- a. **Before you operate.** Always keep in mind the CAUTIONS and WARNINGS. Perform your before PMCS.
- b. **While you operate.** Always keep in mind the CAUTIONS and WARNINGS. Perform your during (D) PMCS.
- c. **After you operate.** Be sure to perform your after (A) PMCS.
- d. **If your equipment fails to operate.** Troubleshoot with proper equipment. Report any deficiencies the proper forms, see TM 38-750.

Table 2-1.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

Within designated intervals, these checks are to be performed in the order listed.

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B — Before
D — During

A — After
W — Weekly

M — Monthly

•	Condenser Intake end discharge grilles	Inspect for loose mounting, obstructions and general condition. See figure 1-3	Grilles are missing
•	Evaporator Adjustable air Intake louvers	Inspect for loose mounting, obstructions and general condition. See figure 1-2	Louvers are missing
•	Interconnecting cable end hoses	See that connectors make firm and secure contact. See figure 1-1	
•	Refrigerant sight glass. See figure 2-1	After 15 minutes of operation in maximum cooling, check for bubbles or milky flow indicating low refrigerant charge. Check for yellow color which indicates presence of moisture. Observe through opening in condenser intake grille.	Bubbles, milky flow yellow color is observed
•	Control panel operating controls. See figure 2-1	Inspect for damage, secure mounting and proper operation.	Control panel is damaged or operated improperly

2-3. OPERATING PROCEDURE

a. All modes of operation are controlled from the control panel on the evaporator section. Outputs controlled by the discharge louvers in the evaporator section and do not require readjustment when a different pattern of coverage is desired or to accommodate the heating or cooling requirements. See figure 2-1b.

WARNING

Open condenser receiver valve before operating unit.

CAUTION

Make sure shorting plug and cap are in place. See figure 1-1.

b. Starting the unit.

- (1) Check to see that instructions of paragraphs 2-5, 2-6, 4-4 and 4-5 Assembly and Preparation and Initial Adjustment and Checks, have been carried out.
- (2) Adjust SW1 for desired fresh air and return air mixture.
- (3) Set SW3 to VENT position.
- (4) Set SW2 to ON position.

c. Cooling Operating Instructions.

- (1) Set SW3 to COOL position.
- (2) Adjust SW4 for desired temperature.

d. Heating Operating Instructions.

- (1) Set SW3 to HEAT position.
- (2) Adjust SW4 for desired temperature.

e. Ventilation Operating Instructions.

- (1) Adjust SW1 for desired fresh air and return air mixture.
- (2) Set SW3 to VENT position.
- (3) Set SW2 to ON position.

f. Normal Shutdown. To shut down the air conditioner, turn SW2 to OFF position.

e. Inspect all panels, hoods, grilles and louvers for loose mounting, obstructions or shipping damage that all interconnecting cables and hoses are properly in place and that connections are tight, that there are no kinks and that the installation has not created a tripping hazard. Inspect for visual damage and loose mountings. Report any deficiencies to organizational maintenance.

b. Perform the preventive maintenance checks and services listed in Table 2-1.

2-7. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES

- e. The unit does not contain a step by step instruction plate or decal.
- b. See figure 2-4 for evaporator section stencils and instruction plates.
- c. See figure 2-5 for condenser section stencils and instruction plates.

Section IV.

OPERATION UNDER UNUSUAL CONDITIONS

2-8. GENERAL INFORMATION

The air conditioner is designed to operate normally within a wide range of climatic conditions. However, extreme conditions require special operating and servicing procedures to maintain high efficiency and minimize wear.

2-9. OPERATION IN EXTREME COLD

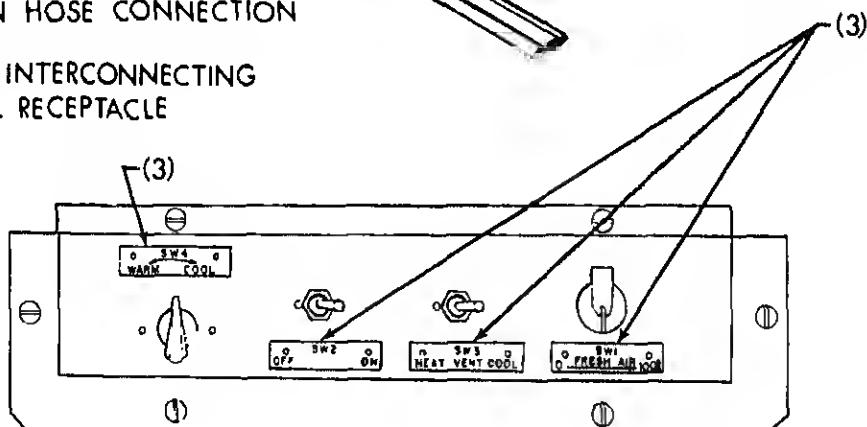
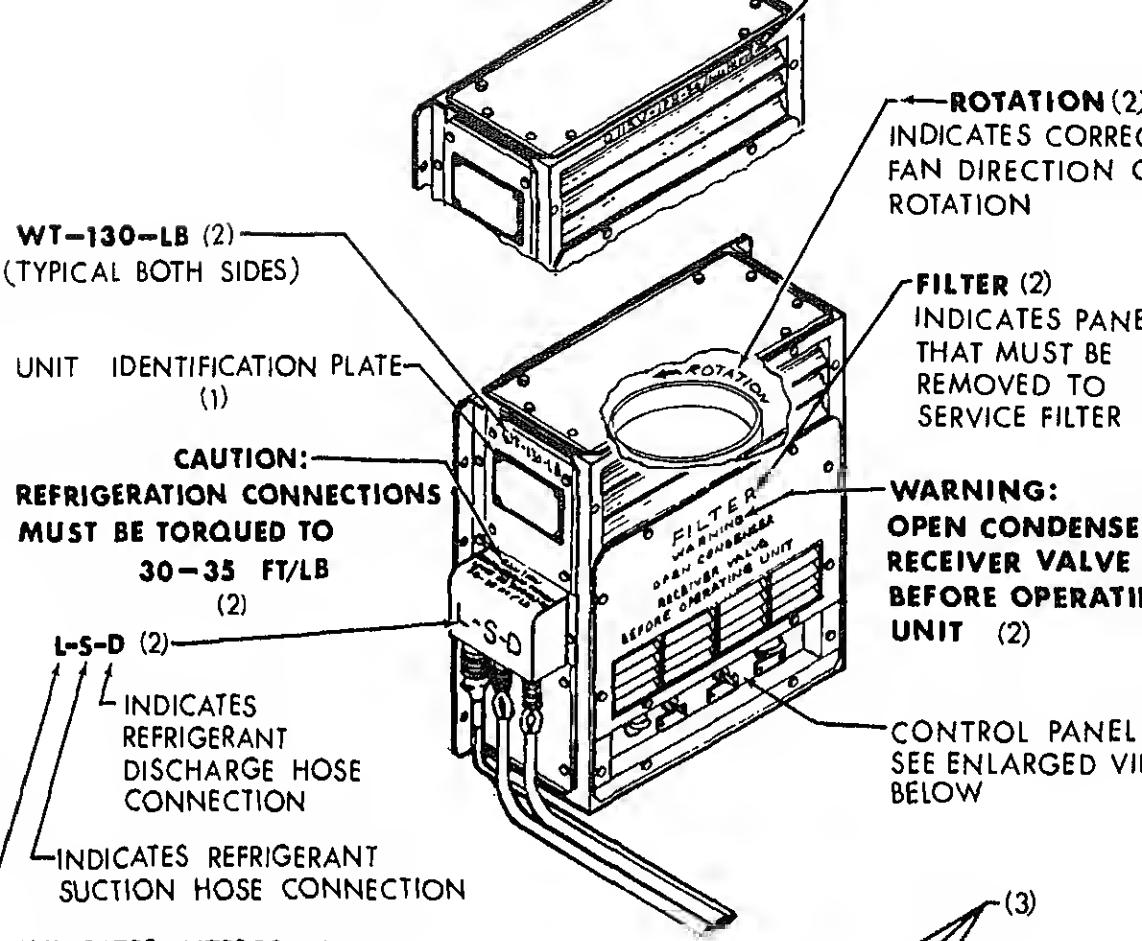
The air conditioner is designed to operate in temperatures as low as 0° F (-18°C) in the cooling mode and as high as 100° F (38°C) in the heating mode.

CAUTION

Operation of either evaporator or condenser fan motors below -65°F (-54°C) can result in damage to equipment.

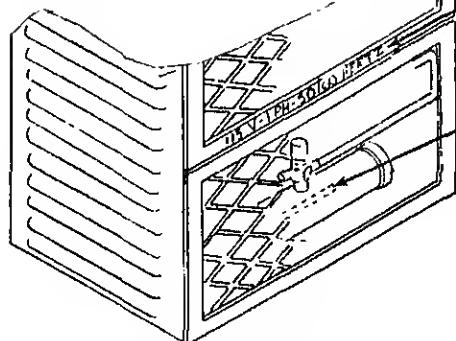
In extremely low temperatures, extra care should be taken to reduce heat loss of the enclosure by:

- e. Weatherstripping windows and doors.
- b. Insulating surfaces exposed to the outside.
- c. Limiting the amount of outside air drawn in through the fresh air louver of the evaporator. Drifting during extremely cold weather. Wire and insulation become brittle, and are easily broken.

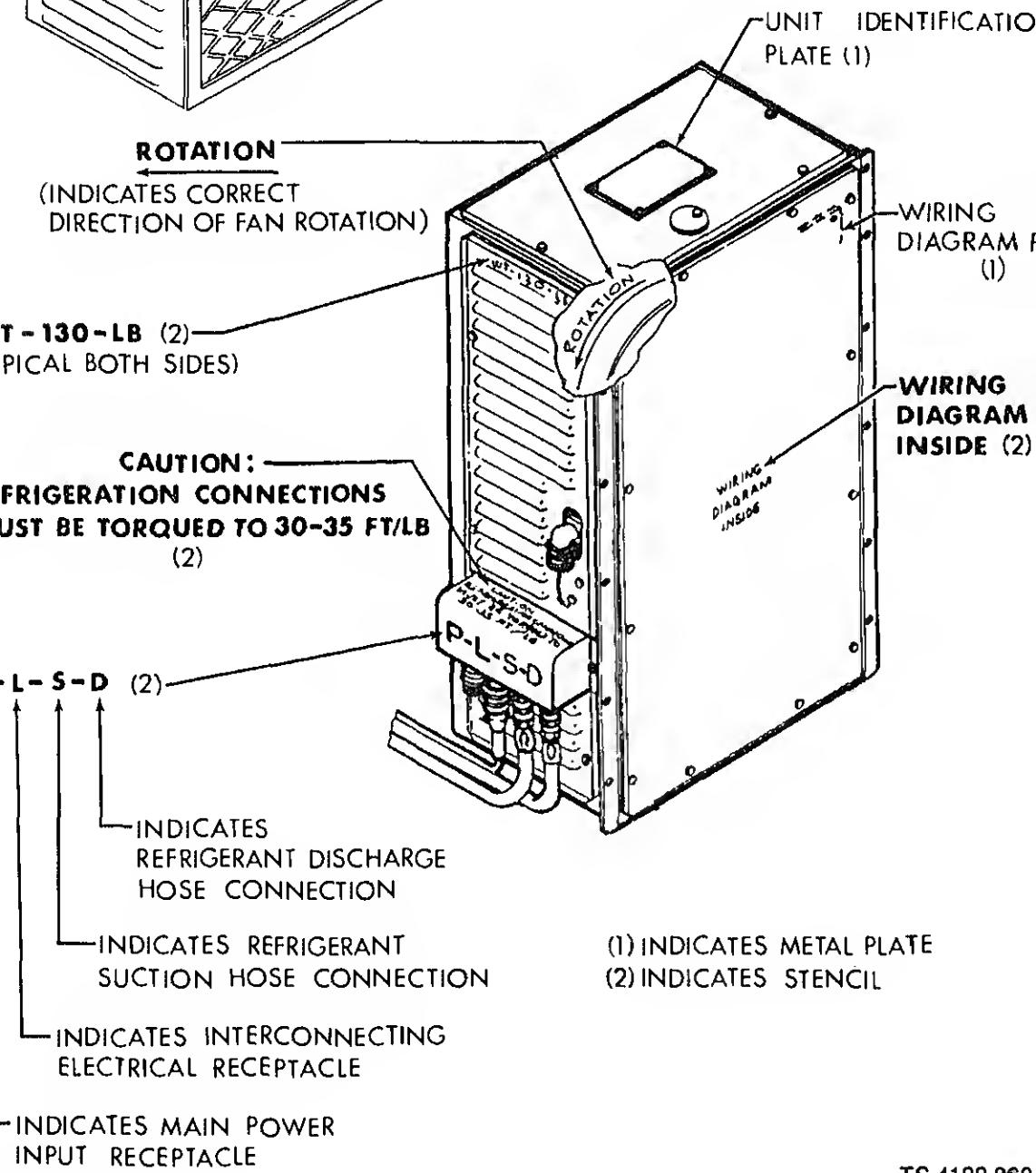


CONTROL PANEL VIEW

- (1) INDICATES METAL PLATE
- (2) INDICATES STENCIL
- (3) INDICATES PLASTIC PLATE



OPEN RECEIVER VALVE BEFORE
OPERATING UNIT, CHARGE
UNIT WITH 2.5 LBS REFRIGERANT
TYPE 12 (2)



extremely high temperatures, extreme care should be taken to reduce the cooling load of the enclosure.

- a. Checking openings such as doors and windows to be sure that they are tightly closed.
- b. Using window shades to shut out direct rays of the sun.
- c. Limiting the use of electric lights and other heat producing equipment.
- d. Limiting the introduction of outside air through the fresh air louver of the evaporator.

-11. OPERATION IN DUSTY OR SANDY AREAS

Sand, dust, dirt, smoke, soot and other debris can seriously reduce the efficiency of the air conditioner. When contamination is a problem, it is essential that the frequency of maintenance performed by organization maintenance on the coils, filter and fans be increased.

-12. OPERATION UNDER RAINY OR HUMID CONDITIONS

The air conditioner is reasonably weatherproof, however, during periods of extremely wet, windy and humid weather, the following precautions should be observed to provide maximum protection to the unit and to assure client operation:

- a. Shield all air inlet and outlets from the rain.
- b. Keep all electrical components clean and dry.
- c. Increase the frequency of maintenance performed by organizational maintenance on the coils, drain pan and outer surfaces under these extreme conditions.

-13. OPERATION IN SALT WATER AREAS

- a. Keep all electrical components clean and dry.
- b. Increase the frequency of maintenance performed by organizational maintenance on the coils, drain pan and outer surfaces under these extreme conditions.
- c. Exposed areas should be spray-rinsed or sponged with clear water periodically to remove salt encrustations.

-14. OPERATION AT HIGH ALTITUDES

There are no special instructions regarding operation and servicing the unit at high altitudes. However, the frequency of maintenance performed by organizational maintenance on the air filter should be increased under these extreme conditions.

-15. EMERGENCY PROCEDURES

To conserve available power during periods when full 115 V, single phase power is not available, the air conditioner should be operated in the ventilate mode only. Do not operate under 90 volts.

Take into account environmental conditions, such as extreme cold or heat, high humidity, blowing
earthquakes, or combinations thereof, and take adequate precautions.

Establish a fire plan, and provide for adequate precautions.

Refer to TM 740-90-1 (Administrative Storage of Equipment) for detailed information on Adminis-
trative Storage.

LUBRICATION INSTRUCTIONS

GENERAL

The compressor is hermetically sealed, with a charge of oil included. The condenser fan end evaporator incorporate sealed bearings, so that no lubrication is required. When necessary to relieve binding dies, fasteners, etc., an application of light machine oil may be worked into the joint or pivot. Excess oil should be blotted up with a cloth or paper towel.

Section II.

TROUBLESHOOTING

USE OF TABLE

Troubleshooting Table 3-1 contains information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner.

Table 3-1 lists the common malfunctions which you may find during the operation or maintenance of your air conditioner or its components. You should perform the tests/inspections and corrective actions listed in order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Any trouble or corrective action beyond the scope of operator maintenance shall be reported to organization personnel maintenance.

1. AIR CONDITIONER DOES NOT START

Check to be sure main power cable is connected.
Connect power cable.

2. COMPRESSOR FAILS TO START

Step 1. Check switch SW3 for COOL setting.
Place switch SW3 in COOL position.

Step 2. Check if switch SW4 is not set at low enough temperature.
Turn switch SW4 clockwise.

3. INSUFFICIENT COOLING

Step 1. Check evaporator air intake and outlet louvers to make sure they are open, able to provide adequate air output.
Open or remove obstruction.

Step 2. Check thermostatic temperature control switch SW4 setting.
Set thermostat at maximum clockwise COOL setting.

Step 3. Check sight glass liquid indicator for bubbles.
If bubbles exist, report condition to organizational maintenance.

4. REDUCED HEATING CAPACITY

Step 1. Check thermostatic temperature control switch SW4 setting.
Set thermostat at maximum counterclockwise WARM setting.

Step 2. Check switch SW1 air louver adjusting switch.
Adjust to admit less cold fresh air.

5. LOUVERS FAIL TO OPERATE

Step 1. Check linkage for possible binding.
Report to organizational maintenance.

Step 2. Check for foreign object in louver blades.
Remove foreign object from louver blades.

6. HEATER FAILS TO OPERATE WHEN EVAPORATOR FAN OPERATES

Step 1. Check if switch SW3 is in HEAT position.
Place switch SW3 in HEAT position.

Step 2. Check if switch SW4 is not set at warm enough temperature.
Turn switch SW4 counterclockwise.

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Preparation For Storage or Shipment

Section I.

REPAIR PARTS, SPECIAL TOOLS, AND SUPPORT EQUIPMENT

GENERAL

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

No special tools are required for maintenance of the equipment. Test, maintenance and diagnostic equipment (TMDE) and support equipment include standard pressure and vacuum gages, vecuum pump, charging manifolds found as standard equipment in any refrigeration shop.

Repair parts are listed and illustrated in the Repair Parts and Special Tools (RPSTL) 5-4120-362-23P covering organizational and direct support maintenance for this equipment.

Carefully remove air conditioner from crate or material used to ship it, including plastic wrapping. Also separate interconnecting hoses and cable from packing.

If evaporator and condenser sections are bolted together, separate them.

Remove protective dust caps from receptacles.

Unplug interconnecting hoses.

Set sections in upright position for checking.

CHECKING UNPACKED EQUIPMENT

Check the air conditioner in accordance with the following instructions:

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750.

Check to see whether the equipment has been modified.

Inspect entire air conditioner for missing or loose hardware or any defects that may have occurred during shipment.

Thoroughly check to see that all wiring, lines and tubing are secure. Especially inspect the evaporator and condenser coils and main power receptacle connector.

Be sure all visible wiring and insulation is not frayed or broken.

Check the evaporator and condenser fan motors for free rotation.

INSTALLATION INSTRUCTIONS

Observe the following requirements and recommendations when installing the air conditioner.

Select a site with the following requirements.

- (1) The air conditioner must have an unobstructed flow of air in order to operate efficiently. Make use of terrain features, trees and buildings if possible to provide a shaded location. This minimizes the cooling load on the refrigeration system.
- (2) Try to place the unit so that prevailing winds do not blow toward the face of the condenser unit.
- (3) Do not locate the condenser unit where intake air is likely to be laden with dust, dirt, soot, smoke or other debris.
- (4) Location of the evaporator section is determined by the internal layout of the enclosure to be conditioned and the length of interconnecting hoses. As far as possible, locate the unit so that the conditioned air discharges toward the area most critically in need of cooling. Discharge direction can be controlled somewhat by adjustment of the discharge louvers. The installation should allow excess

The unit should be located as near as possible to a source of 115-volt, single phase, 60/60 hertz electric power. The electrical power supply receptacle is located on the condenser section (figure 1-1).

The evaporator and condenser sections are designed for wall or floor mounting. See Table 4-1 figures 4-1 and 4-2.

TABLE 4-1 — INSTALLATION DRILLING INSTRUCTIONS

Type of Mounting	Condenser Section	Evaporator Section
Floor	Drill four 0.50 in. (1.27 cm) diameter holes per figure 4-1. Use four .3125-24 UNF (length as required) bolts for mounting.	Drill four 0.50 in. (1.27 cm) diameter holes per figure 4-1. Use four .3125-24 UNF (length as required) bolts for mounting. Drill two 0.69 in. (1.75 cm) diameter drainage holes.
Wall	Drill ten holes for 0.25 in. (0.63 cm) diameter bolts or lag screws per figure 4-2.	Drill eight holes for 0.25 in. (0.63 cm) diameter bolts or lag screws per figure 4-2.

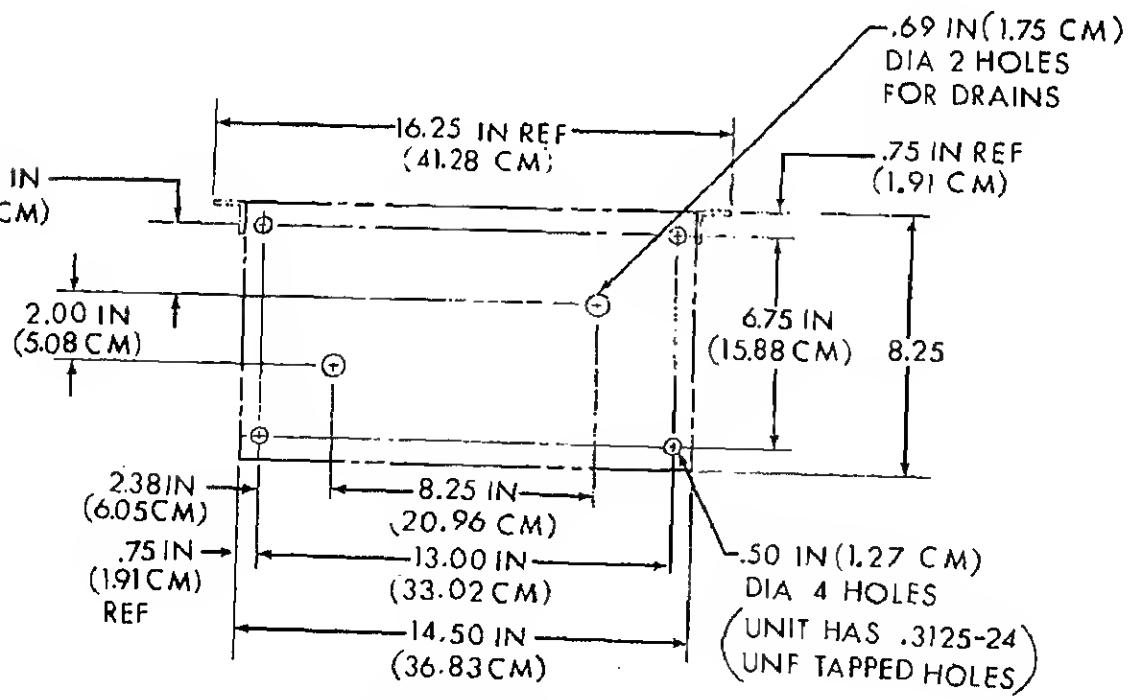
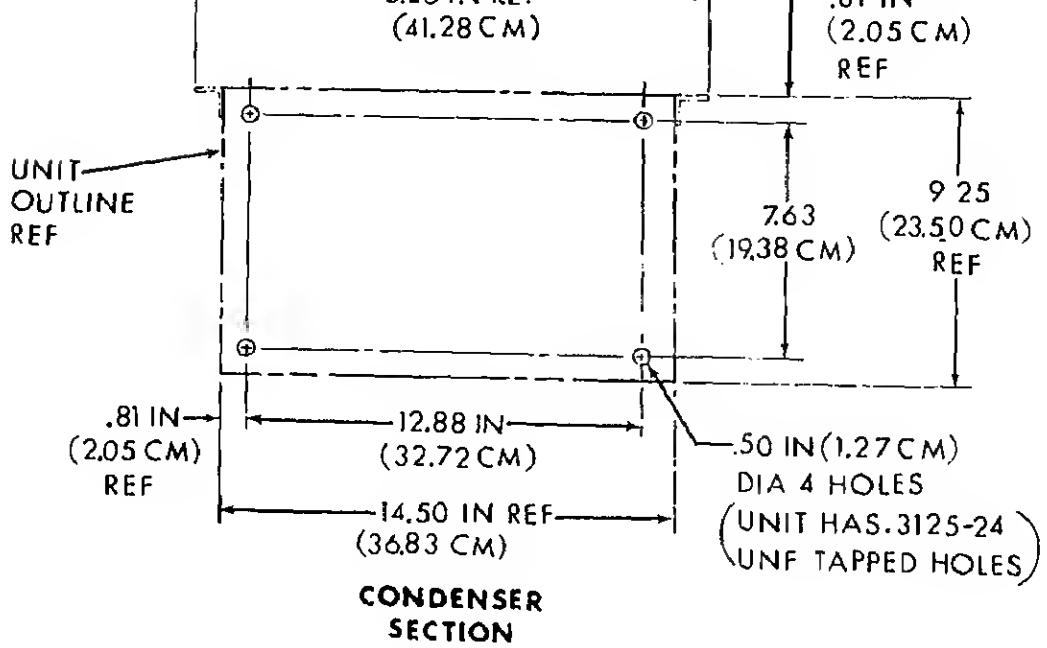
The evaporator section should be mounted on a level supporting surface. If a level surface is not obtainable, the unit may be mounted at an angle no greater than five degrees from the horizontal.

Two drain connections are located on the evaporator section drain pan. If the unit is placed so that drain lines are necessary, they are to be connected per the following instructions:

- (1) Connect a drain line to both drains if possible. If this is not possible connect to the lowest of the drains.
- (2) Use standard .25-18 NPT fittings to connect to the drains in the pan.
- (3) Using tubing, rigid pipe or hose, direct the condensate water to an existing drain, storm sewer or sump.

Connections between the condenser and evaporator sections.

- (1) Connect the larger refrigerant hose to the fittings marked S. Use two wrenches, one to hold the on the unit stationary, and the other to tighten the coupling to approximately 35 foot pounds (47 newton meters) of torque.



EVAPORATOR SECTION

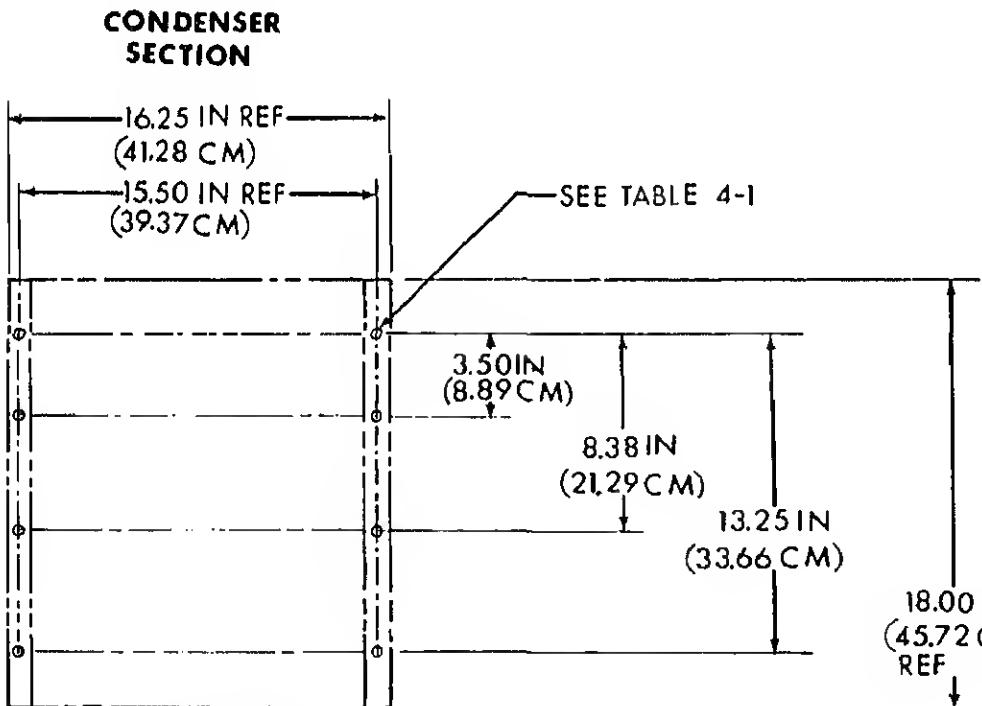
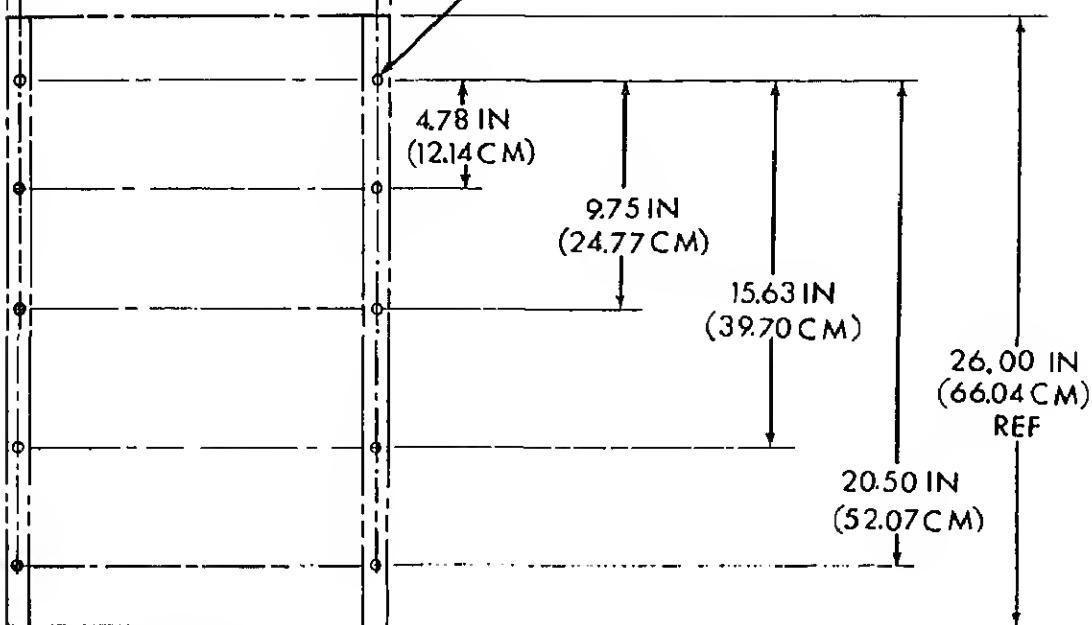


Figure 4-2. Wall Mounting Diagram.

(2) Connect the smaller refrigerant hose to the fittings marked 'D', following the same instructions as connection of larger hose.

WARNING

EQUIPMENT DAMAGE

may be caused if unit is operated prior to opening of condenser receiver valve.

(3) The receiver valve is located in the condenser section immediately behind the air intake grille (figure 2-4.). Remove the valve stem cap to expose the stem. Turn this stem counterclockwise as far as it will go and replace end tighten cap. A slight hissing sound may be heard during this process as refrigerant is released from the tank into the system.

(4) Connect the female end of the electrical cable to the receptacle marked L on the evaporator section. Connect the male end to the receptacle marked L on the condenser section.

(5) Plug in the shorting plug which is chained to the connector on the condenser section equipment hood.

CAUTION

Make sure power and power supply plug are compatible with the unit's requirements of a 4-wire power system of two 115 volt ac lines, two common 0 volt lines of single phase 50/60 Hertz power.

NOTE

The shorting plug must be used when a time delay unit, for operation of two air conditioners, is not used.

(6) Connect the 4-wire power supply cable female end to the receptacle marked P on the condenser section. The other end of the cable is connected to the power supply.

4-5. INITIAL ADJUSTMENTS AND CHECKS

a. Perform the following preliminary checks:

- (1) Set Switch SW3 to VENT position.
- (2) Set Switch SW2 to ON.
- (3) Observe direction of evaporator fan rotation (the only fan that should be operating). Rotation should be counterclockwise when looking down into the evaporator section. See figure 2-4. Double check by noting that air is being discharged out of the four discharge air louvers just above the control panel. If rotation is clockwise, shut off power and check motor wiring.

b. Check operation of controls as follows:

- (1) Set Switch SW2 to ON.

Turn Switch SW4 clockwise. The condenser fan and compressor should start. Check the condenser rotation. It should be counterclockwise when seen through the rear of the condenser section. See 2-5.

Move the slight glass. It should be clear and free of bubbles after 15 minutes of operation. If operated, unit is ready for service. If any malfunction is noted, consult the troubleshooting section 1-1 before performing steps again.

Section III.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

INTRODUCTION

The necessary preventive maintenance checks and services to be performed at the organization on a quarterly schedule are listed and described in Table 4-2.

They are arranged in a logical sequence as indicated by the item numbers. These numbers shall be used as a source of item numbers for the TM Number Column on DA Form 2404, Equipment Inspection/Maintenance Worksheet, in recording results of PMCS.

The Item to be Inspected column lists the part or group of parts to be checked and serviced. These are identified in figures 4-3 and 4-4.

The Procedures column contains a brief description of the procedure by which the check is performed.

Electrical power should be disconnected from the air conditioner for all checks except the final inspections check of the controls.

Section IV

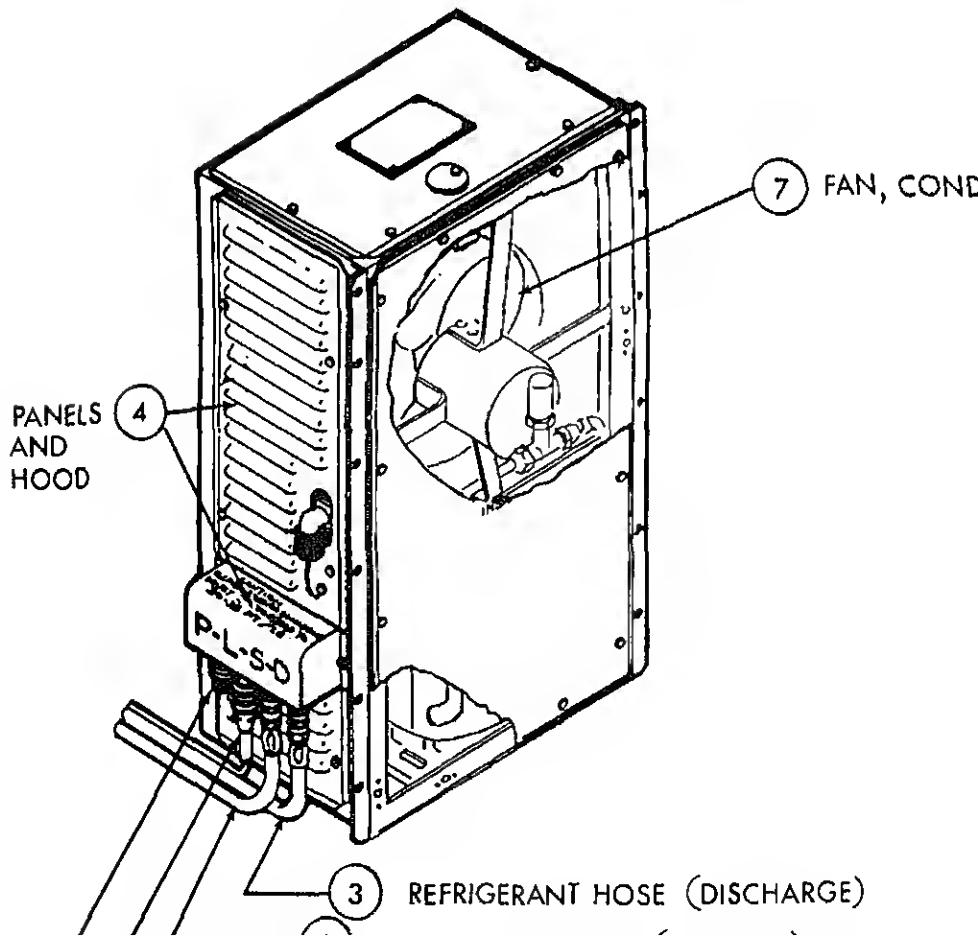
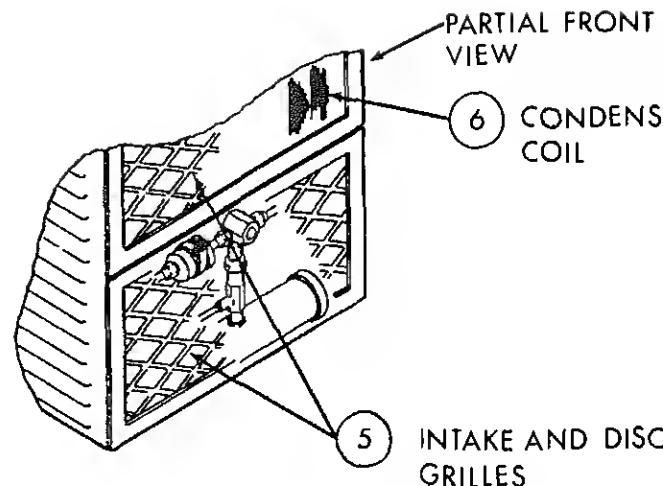
TROUBLESHOOTING

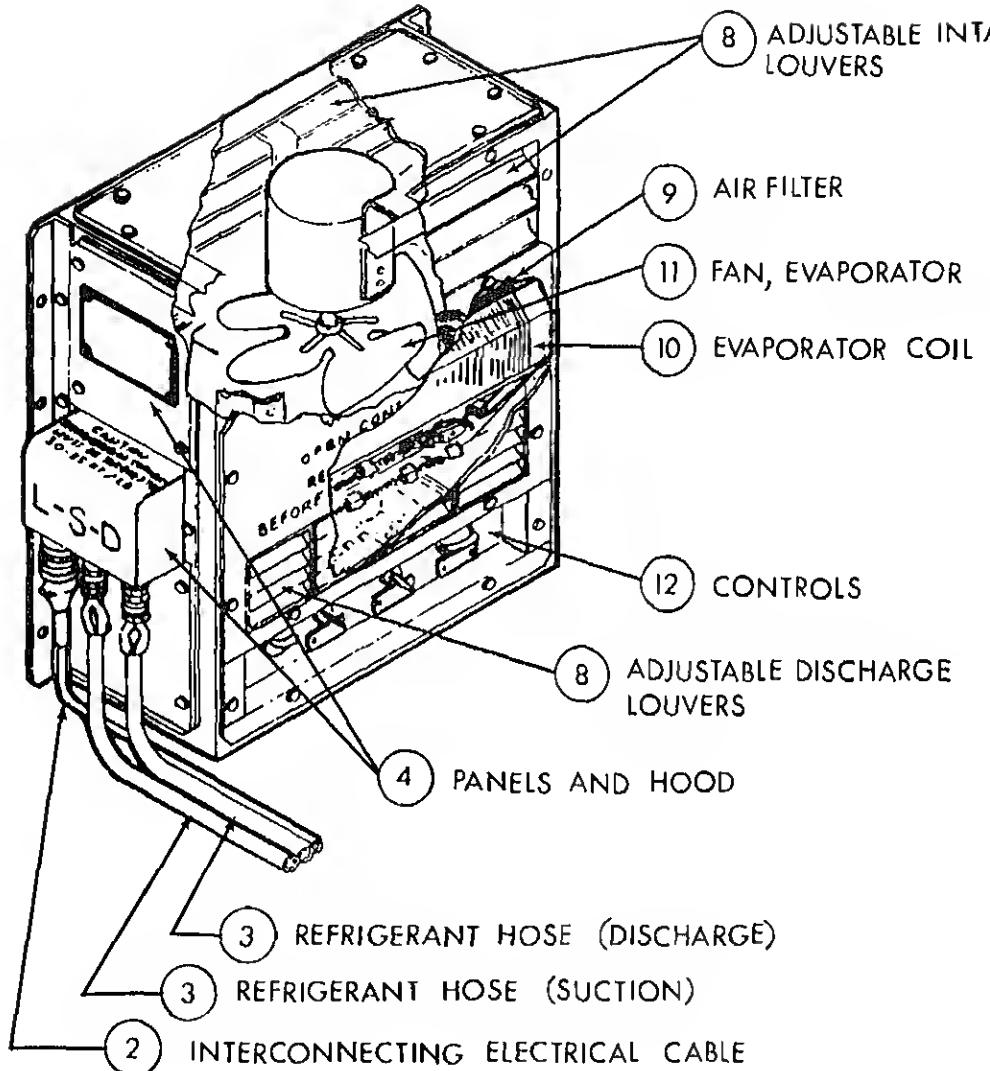
GENERAL

This Section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the air conditioner. Each malfunction for an individual component, system or subsystem is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed, or is not corrected by listed corrective actions, notify your supervisor.

Table 4-3 lists the common malfunctions which you may find during the operation or maintenance of the air conditioner or its components. You should perform the tests/inspections and corrective actions in the order listed.





TS 4120-362

WARNING

Disconnect power from the elr conditioner.
Tha voltage used can be lethal.

Electrical power supply cable and connector	Check cable for cuts, cracks and abraslone. Replace cable If defect is found that would axpose copper conductor.
Intarconnecting electrical cable	Check cable for cuts, cracks end abrasions. Replace cable If defact is found that would exposse copper conductor.
Refrigerant hoses	Inspect hoses for signs of laakega, ebrealon, kinking or wear. Rafer to diract support meltenence for replacement.
Panels end hoods (both sections)	Check for loose mounting hardware or damage. Tighten end repair or replace panels end hoods es necessary. Repleca any missing or demaged mounting herdware.
Intaka end discherga grillas	CONDENSER SECTION Inspect for obstructions, loosa mounting hardware or damage. Repair or replace damaged grilles. Remove ell obstructions and tighten mounting hardware.
Condenser Coil	Check for obstructions, damage, leaks end dirt. If damage or leaks ere found, report defect to diract support meltenence. Remove obstructions and clean coil If necessary. Be careful not to demege fins. See peragraph 4-29 for spacific claeining Instructions.
Fen, Condanser	Check for dirt, demage and abnormal vibration. See peragraph 4-15 for specific Inspection, claeining, repair and replacment procedurea.
Adjutabla Intaka end Discharge Louvers	EVAPORATOR SECTION Inspect for obstructions, easa of oparetion, loose mounting hardware and damagad or broken parts. Sea paragreh 4-37 for spacific Inspection, cleaning, repair, lubrcation, rapair and raplecmant procedures.
Air filter	Claen and service or riplaco If parforetd, torn or otherwise demeged. Sae peragraph 4-45 for spacific removal, inspection, claeining, and reinstallation instructions.

		NOTE Perform PMCS on evaporetor coil before installing filter.
0	Evaporator Coll	Check for obstructions, damage, leaks and dirt. If damage or leaks are found, report defect to direct support maintenance. Remove obstructions and clean coil if necessary. Be careful not to damage fins. See paragraph 4-47 for specific cleaning instructions.
1	Fan, Evaporator	Check for dirt, damage and abnormal vibration. See paragraph 4-38 for specific inspection, cleaning, repair and replacement procedures.
2	Controls	Inspect controls for loose or broken knobs. Tighten or replace as necessary. Connect power to air conditioner. Check controls for proper operation. See paragraph 2-1. Should malfunction be noted, see Table 4-3, Troubleshooting Chart, and repair as indicated.

*Service monthly or more often when required by operation under severe conditions.

NOTE

Before you use this Table, be sure you have performed all applicable operating checks.

TABLE 4-3 — TROUBLESHOOTING

FUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
----------	--------------------	-------------------

R CONDITIONER DOES NOT START

- Step 1. Check to be sure main power cable is connected and that power is on.
Connect power cable and turn power on.
- Step 2. Check to see that switch SW2 is in the ON position.
Turn switch SW2 to ON.
- Step 3. Verify that pressure switch has not tripped.
Open pressure switch reset cover and press reset button.

WARNING

Disconnect power from the air conditioner before doing maintenance work on the electrical system. The voltage used can be lethal.

- Step 4. Make sure that power supplied is compatible with unit's 4-wire, 115 V, single phase, 50/60 Hz requirement.

Check each wire of supply line with voltmeter per figure 4-7, Wiring Diagram.

Step 5. Inspect main power receptacle connector for defects.

Replace defective connector.

Step 6. Check for loose electrical connections.

Tighten all loose connections.

Step 7. Check fuse F1. Neon glow indicator lit indicates bad fuse.

Replace bad fuse. See para 4-14.

Step 8. Check rectifier CF1. See para 4-18. With 115 volts ac input, the output should be 103 v.

Replace bad rectifier CF1.

2. EXCESSIVELY NOISY OPERATION

CAUTION

If knocking or hammering is heard when air conditioner is started up, shut down at once and report the condition to direct support maintenance. The compressor may be pumping liquid refrigerant, which will cause severe damage.

Step 1. Listen for knocking or hammering sounds.

Shut down and report to direct support maintenance.

Step 2. Check for defective compressor. See para 4-22.

Report to direct support maintenance.

Step 3. Check evaporator fan for looseness, vibration or interference. See para 4-38.

Tighten setscrews. Look for bent or broken blades that would cause an out-of-balance condition. Replace defective fan as necessary.

Step 4. Check condenser fan for looseness, vibration or interference. See para 4-15.

Tighten setscrews. Look for bent or broken blades that would cause an out-of-balance condition. Replace defective fan as necessary.

Step 5. Check evaporator fan motor for noise as indicated by noisy operation or excessive shaft end play.

Replace bearings or motor.

Step 6. Check condenser fan motor for noise as indicated by noisy operation or excessive shaft end play.

Replace bearings or motor.

3. EVAPORATOR FAN MOTOR DOES NOT START

Step 1. Make sure electrical power is supplied to motor.

Tighten connections or connect cable.

WARNING

Disconnect power from the air conditioner before doing maintenance work on the electrical system. The voltage used can be lethal.

Step 2. Check switch SW2 for defects (para 4-34).

Replace defective switch SW2.

Step 3. Check continuity of circuit between power supply and motor. See figure 4-7, Wiring Diagram.

Tighten loose connections. Repair or replace damaged wires.

Step 4. Check fan for freedom of rotation (para 4-38).

Relieve binding of fan blade.

Step 5. Check fan motor temperature.

Replace defective motor.

Step 6. Check for burned out fan motor (para 4-39).

Replace burned out fan motor.

Step 7. Check for defective power relay (para 4-41).

Replace defective power relay.

N ROTATION WRONG (Evaporator and Condenser)

Step 1. Check for wrong motor wiring. See Wiring Diagram, figure 4-7.

Make motor wiring corrections.

CONDENSER FAN MOTOR DOES NOT START

Step 1. Make sure electrical power is supplied to motor.

Tighten connections or connect cable.

WARNING

Disconnect power from the air conditioner before doing maintenance work on the electrical system. The voltage used can be fatal.

Step 2. Check whether switch SW3 is on COOL.

Place switch SW3 in COOL position.

Step 3. Check whether switch SW4 is set in low enough temperature.

Set switch SW4 on COOL.

Step 4. Check for defective power relay (para 4-41).

Replace defective power relay.

Step 5. Check selector switch SW3 for defects. See paragraph 4-35.

Replace defective switch SW3.

Step 6. Check fan for freedom of rotation. See paragraph 4-15.

Relieve binding.

Step 7. Check fan motor temperature.

Replace defective motor.

Step 8. Check for burned out fan motor. See paragraph 4-16.

Replace burned out fan motor.

SUFFICIENT COOLING

Step 1. Check for closed receiver valve.

Open receiver valve.

Step 2. Check evaporator air intake and outlet louvers to make sure they are open, not obstructed to provide adequate air output.

Open louvers or remove obstruction.

Step 3. Test evaporator fan motor for defects. See paragraph 4-39.

Replace evaporator motor.

Step 4. Test compressor for defects. See paragraph 4-22.

Report to direct support maintenance.

Step 5. Check thermostat for defects. See paragraph 4-38.

Replace defective thermostat.

Step 6. Check sight glass liquid indicator for bubbles. If bubbles exist, check for leakage. See Table item 5.

Report to direct support maintenance.

Step 7. Check for clogged filter-drier. Feel filter-drier for temperature difference. Discharge either feel cooler than input end if clogged, or may be sweaty or frosty.

Report to direct support maintenance.

7. EVAPORATOR AIR OUTPUT VOLUME INSUFFICIENT

Step 1. Inspect filter for dirt and clogging. See paragraph 4-45.

Clean or replace filter.

WARNING

Disconnect power from the air conditioner before doing maintenance work on the internal parts. The voltage used can be lethal.

Step 2. Evaporator fan loose, binding or damaged.

Tighten setscrews or relieve binding as necessary. Replace damaged fan.

Step 3. Check evaporator fan motor for operation. See paragraph 4-39.

Replace evaporator fan motor.

Step 4. Check evaporator coil for dirt.

Clean evaporator coil. See paragraph 4-47.

Step 5. Check evaporator coil for iced-up condition. If icing is found, it will usually indicate a low load, thermostat is set too low, air flow is blocked or a low refrigerant charge.

CAUTION

Do not use steam, open flame, heat gun or any other high-temperature heat source to thaw an iced coil.

Thaw an iced coil with a lamp bulb (75-watt maximum), hair drier, electric fan or by leaving the unit shut down until ice melts. If condition reoccurs report to direct support maintenance.

8. HEATER FAILS TO OPERATE WHEN EVAPORATOR FAN OPERATES

Step 1. Check if switch SW3 is in HEAT position.

Place switch SW3 in HEAT position.

Step 2. Check if switch SW4 is not set at high enough temperature.

Turn switch SW4 counterclockwise.

Step 3. Inspect power relay K4 for breaks, cracks, corrosion, rust and loose electrical connection. Check continuity of pins 6 and 7 after relay is removed from socket.

Replace defective relay.

Step 4. Check if heating coil elements are burned out.

Replace heating coil element (para 4-46).

COMPRESSOR FAILS TO OPERATE

Step 1. Make sure switch SW3 is set on COOL.

 Place switch SW3 in COOL position.

Step 2. Check if switch SW4 is not set at low enough temperature.

 Turn switch SW4 clockwise.

Step 3. Check for loose connections in wiring.

 Tighten loose connections.

Step 4. Inspect power relay K4 for breaks, cracks, corrosion, rust and loose electrical connection.

 Check continuity of pins 6 and 7 after relay is removed from socket.

 Replace defective relay.

Step 5. Check for defective selector switch SW3.

 Replace defective selector switch SW3 (part 4-35).

Step 6. Check for defective compressor (part 4-22).

 Report to direct support maintenance.

COOLING EXCESSIVELY IN COOLING MODE

Step 1. Check for defective thermostatic expansion valve.

 Report to direct support maintenance.

Step 2. Inspect power relay K4 for breaks, cracks, corrosion, rust and loose electrical connection.

 Check continuity of pins 6 and 7.

 Replace defective power relay K4.

Step 3. Check thermostat control S4 for defects.

 Replace defective thermostat control S4.

LOUVERS FAIL TO OPERATE

Step 1. Check linkage for possible binding.

 Straighten linkage.

Step 2. Check for defective control.

 Replace control (part 4-37).

Step 3. Check for defective louver.

 Replace louver.

Step 4. Check for foreign object in louver blades.

 Remove foreign object from louver blades.

Section V

MAINTENANCE PROCEDURES

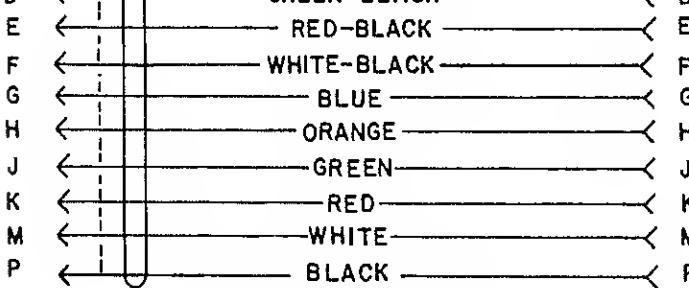
INTERCONNECTING CABLE ASSEMBLY

(figure 4-5).

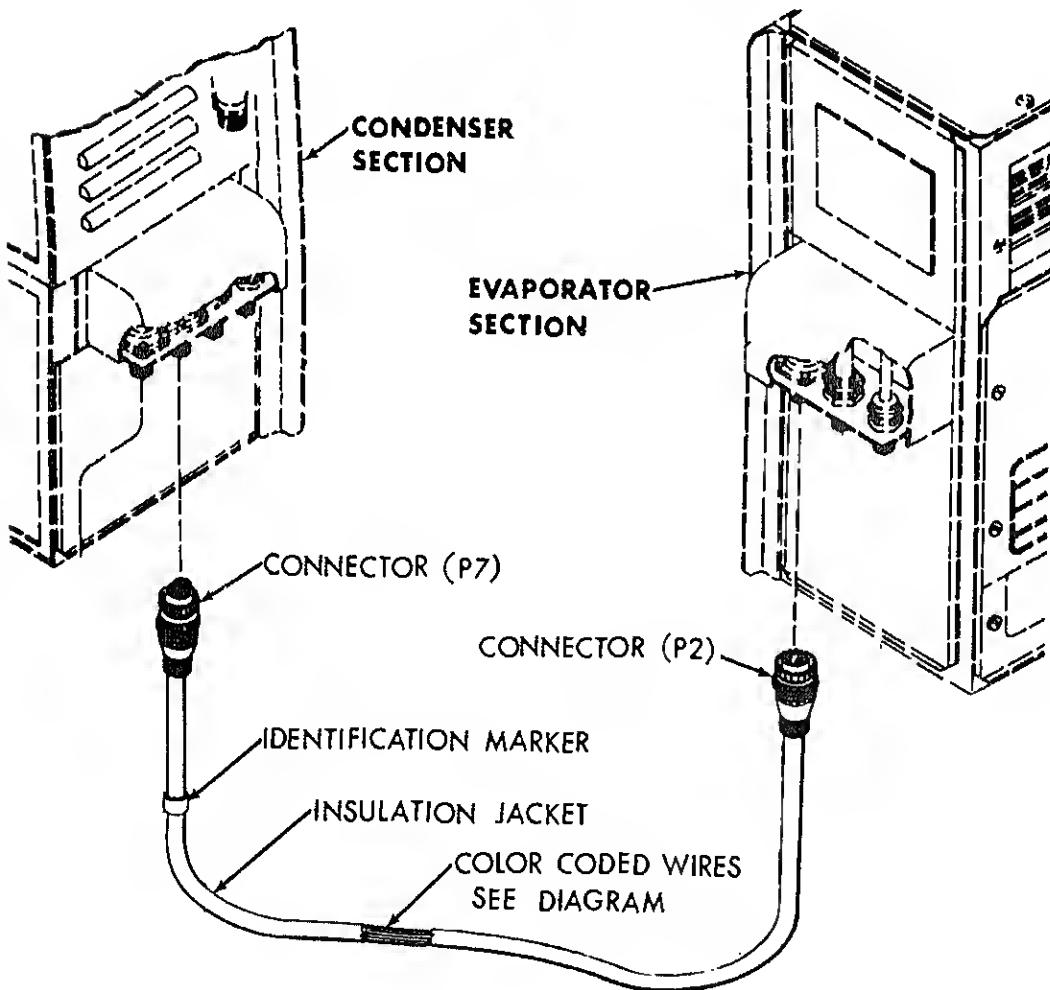
WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

Removal. Unscrew both connectors and remove the interconnecting cable assembly.



SCHEMATIC DIAGRAM



TS 4120-362-13/4-5

Figure 4-5. Interconnecting Cable.

) Check individual wires for loose solder connections or damaged wires. Repair solder connections and replace damaged wires.

Testing. Using wiring diagram in figure 4-5, check individual wires for continuity. If continuity is indicated, check solder connections and replace all damaged wires.

Repair. When repairing solder joints, wire connections must be made mechanically sound before soldering; solder alone does not provide sufficient strength to prevent breakage. Surfaces of components to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-4995, Type I, resin-alcohol flux, and should be brushed onto the joint before soldering. If a rosin solder is used, it should always be resin-rosin electrical solder. If an uncored solder is used, it should be a lead-tin solder conforming to Specification QQ-S-571. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive buildup of solder around the joint should be avoided or removed.

Installation. Screw connector P2 to the connection point marked L on the evaporator section. Screw connector P7 to the connection point marked L on the condenser section. Make sure they are tight.

REFRIGERANT HOSES (figure 4-6).

Inspection/test-Installed. Check hose ends and fittings for cracks, breaks and other obvious defects. Check hose for abrasions, cuts and cracks. Inspect hose assemblies and fittings for any indication of refrigerant leakage. If leakage is indicated, test by one of the following methods:

CAUTION

The electronic leak detector is sensitive to the presence of refrigerant gas in the atmosphere. When refrigerant gas is present in the atmosphere of work area, false indications can result. Use in a well ventilated but draft-free area.

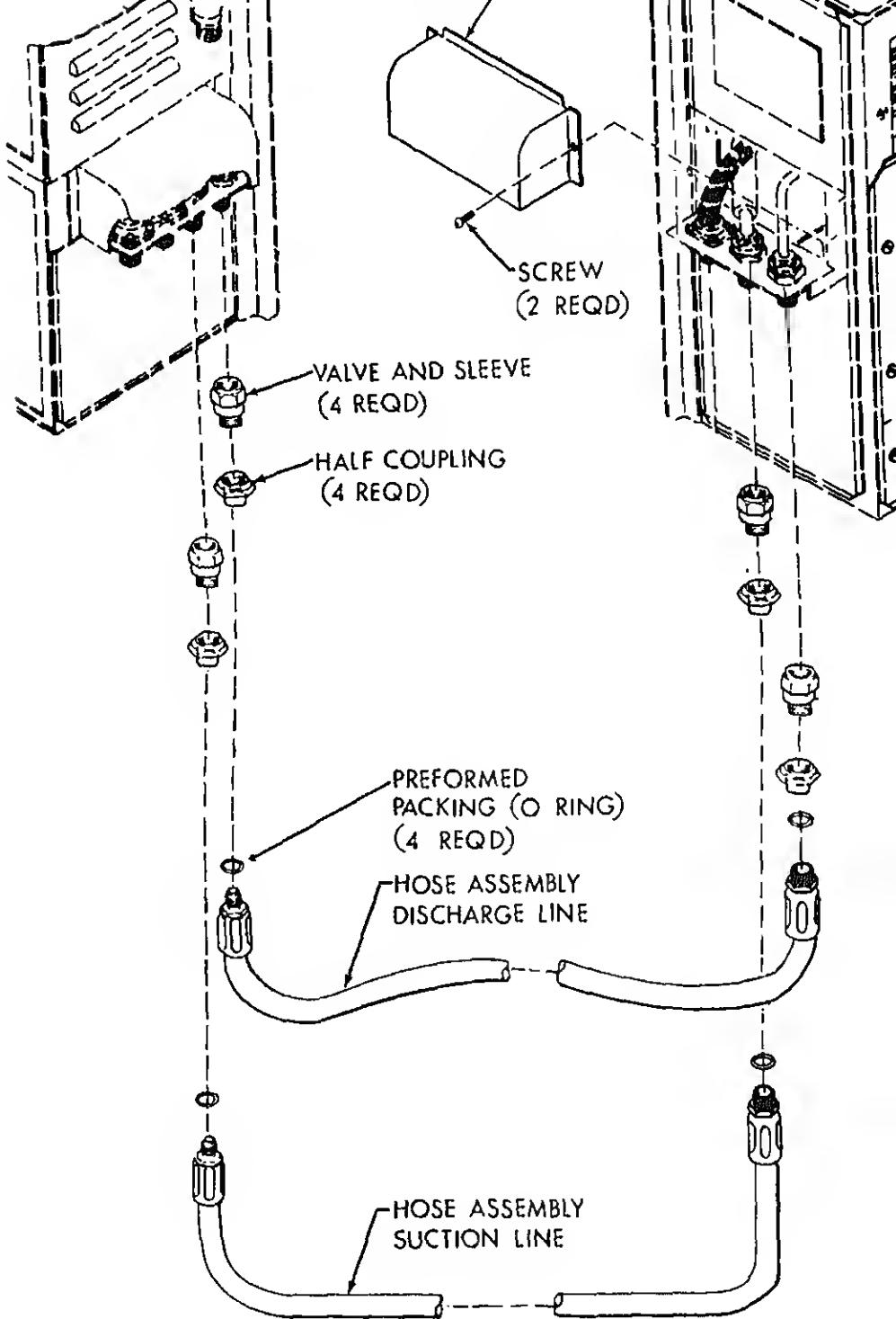
) Electronic Leak Detector. Turn the electronic unit on, and slowly pass the probe around all points in the refrigeration system at which a leak could exist. Depending upon the type of detector used, a leak will be indicated by an audible signal, a light, or by meter deflections.

) Soap Solution. Brush soap solution on all possible points of leakage, and watch for bubbles. Follow a definite sequence to avoid missing any points that should be tested. Wipe the solution from joints, and mark any point at which a leak is found.

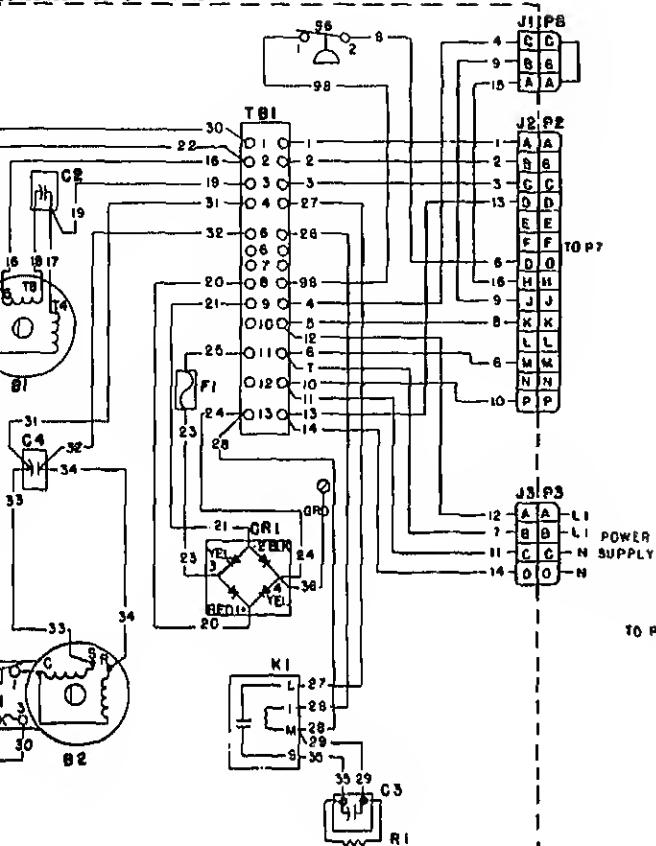
Replacement. If inspection/test results show any of the above defects, report to direct support maintenance for hose removal and replacement.

ELECTRICAL CONNECTOR (POWER SUPPLY)

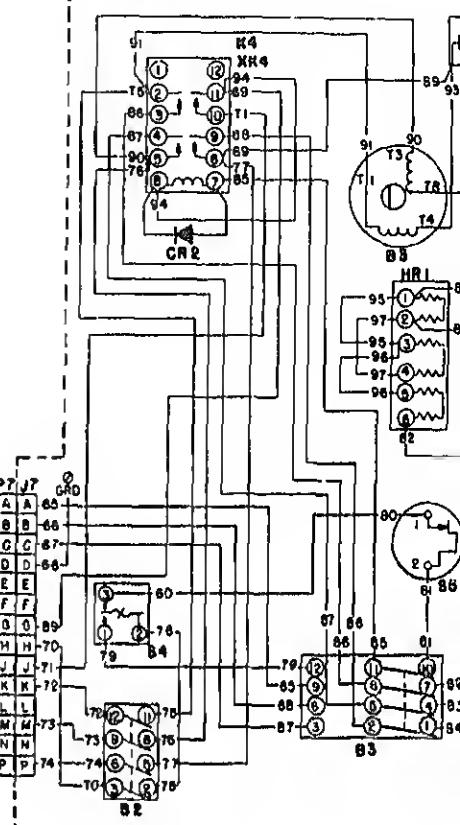
Connector is supplied as original equipment with the air conditioner. The connecting cable and end of the power source may vary since this is installed by the user. See wiring diagram, figure 4-7 and location, figure 4-3 for location.



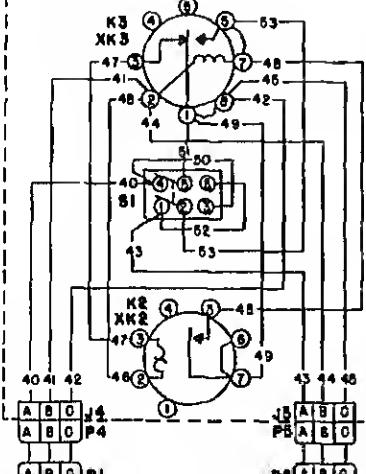
CONDENSER SECTION UNIT NO.1



EVAPORATOR SECTION UNIT NO.1



TIME DELAY UNIT



LEGEND	
BYM	DESCRIPTION
P1	CONNECTOR
P2	CONNECTOR
P3	CONNECTOR
P4	CONNECTOR
P5	CONNECTOR
P6	CONNECTOR
P7	CONNECTOR
P8	SHORTING PLUG
S1	SWITCH TOGGLE
S2	SWITCH TOGGLE
S3	SWITCH TOGGLE
S4	CONTROL THERMOSTAT
S5	THERMOSTAT
TBI	TERMINAL BOARD
XX2	SOCKET
XH3	SOCKET
XH4	SOCKET
K1	RELAY
K2	RELAY/THERMAL TIME DELAY
--	SWITCH

E TIME DELAY UNIT REQUIRED TO
CREATE TWO AIR CONDITIONERS.
PROCEDURE FOR CONNECTING SECOND
CONDITIONER.
REMOVE PB FROM CONDENSER SECTIONS
CONNECT P1 TO J1 OF FIRST AIR
CONDITIONER.
CONNECT P6 TO J1 OF SECOND AIR
CONDITIONER.

Removal. Unscrew the connector and remove from the condenser section.

Inspection. Inspect for damage and loose or broken pins. Replace if defective.

Installation. Screw the connector to the connection point marked P on the condenser section.

11. PANELS, GRILLES AND HOOD (CONDENSER SECTION) (figures 4-8 and 4-9).

- c. Description. The condenser section is housed within metal panels, fixed louvered panels and grilles. Quick release 1/4 turn stud fasteners permit easy removal of panels and grilles except the discharge grille, access cover and hood. The discharge air grille and the hood are retained by standard mechanical screws.
- c. Removal. Remove the panels, louvered panels and grilles that have quick release 1/4 turn stud fasteners by turning the fasteners 1/4 turn counterclockwise and pulling the panel, louvered panel or grille outward. Remove the screws that retain the discharge grille and the hood.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

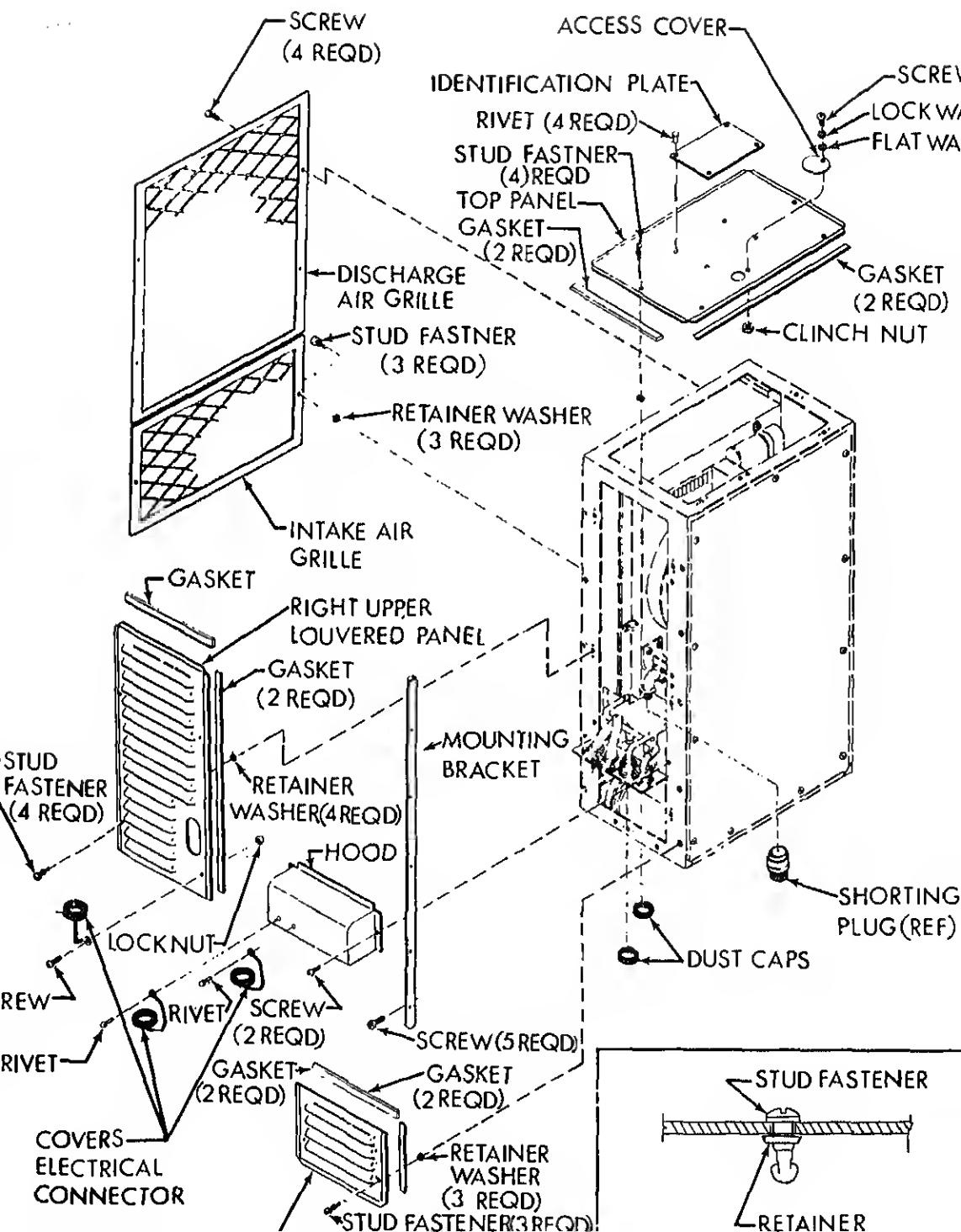
- c. Cleaning. Clean the panels, louvers and grilles with a cloth dampened with a detergent solution and dry cleaning solvent (Fed Spec P-D-680). Use a soft brush if necessary to dislodge caked on dirt. Do not use abrasive materials.
- d. Inspection/Repair. Inspect panels, louvers and grilles for breaks, cracks, dents, loose or missing mounting hardware or other defects. Repair breaks, cracks, and dents using conventional sheet metal methods. Replace missing mounting hardware and panels damaged beyond repair. Inspect the identification plate riveted to the outside of the top panel and the wiring diagram plate riveted to the rear panel for legibility and obvious damage. Replace if you cannot read all of the information on the plate. Inspect gasket material for hardening, permanent set, cuts, tears or missing pieces necessary to replace gasket material, use the following procedure:

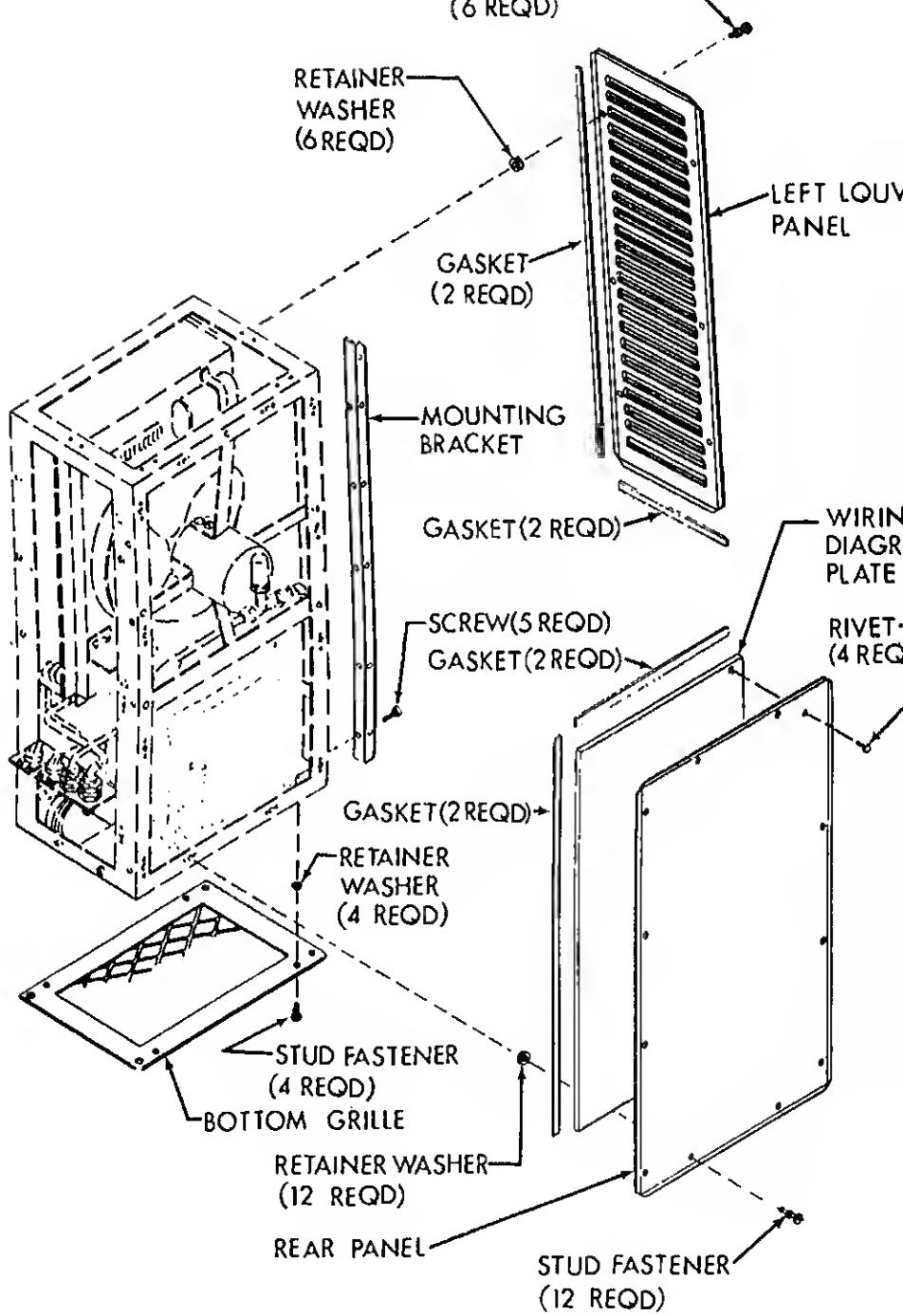
- (1) Remove as much old gasket material as possible by pulling or scraping it away from the surface.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use in a well-ventilated area, wear gloves, and keep away from sparks or flame.

- (2) Soften and remove old adhesive and gasket residue, using acetone or methyl-ethyl ketone and a stiff brush.





- Access cover. Install on top panel using a screw, lock washer and flat washer. A retained nut is provided in the top panel to retain this hardware. Tighten so that access cover can be moved without loosening the screw with a screwdriver.
- Identification plate and wiring diagram plate. If these plates were removed, reinstall with rivets.
- If electrical connector covers were removed, reinstall with screw and nut or rivets.
- Attach the hood and discharge air grilles with screws.
- See the typical stud fastener installation detail on figure 4-8 for installation of any missing fasteners.
- Position the remaining panels and grilles and engage the 1/4 turn stud fasteners.

CONNECTOR ELECTRICAL (SHORTING PLUG)

(figure 4-7).

Description. The shorting plug is used for single unit installations. See the wiring diagram (figure 4-7) for further information. The shorting plug is P8 on the wiring diagram.

Removal. The shorting plug is located on the right side of the condenser section (figure 4-8). Unscrew the connector protective cover. Remove shorting plug.

Test. Check for continuity between pins A and C. If continuity is not indicated, check solder connections and condition of wire. Repair bad solder connections and replace jumper wire if it is damaged.

Repair. During repair of solder joints, wire connections must be made mechanically sound before being soldered; solder alone does not provide sufficient strength to prevent breakage. Surfaces of components to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-4995, Type I, resin-alcohol flux, and should be brushed onto the joint before soldering. If no flux or solder is used, it should always be resin-core electrical solder. If an uncored solder is used, it should be a lead-tin solder conforming to Specification QQ-S-571. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive buildup of solder around the joint should be avoided or removed.

Installation. Screw shorting plug to elbow connector on the right side of the condenser section. Make sure it is tight. Screw the connector protective cover back in place.

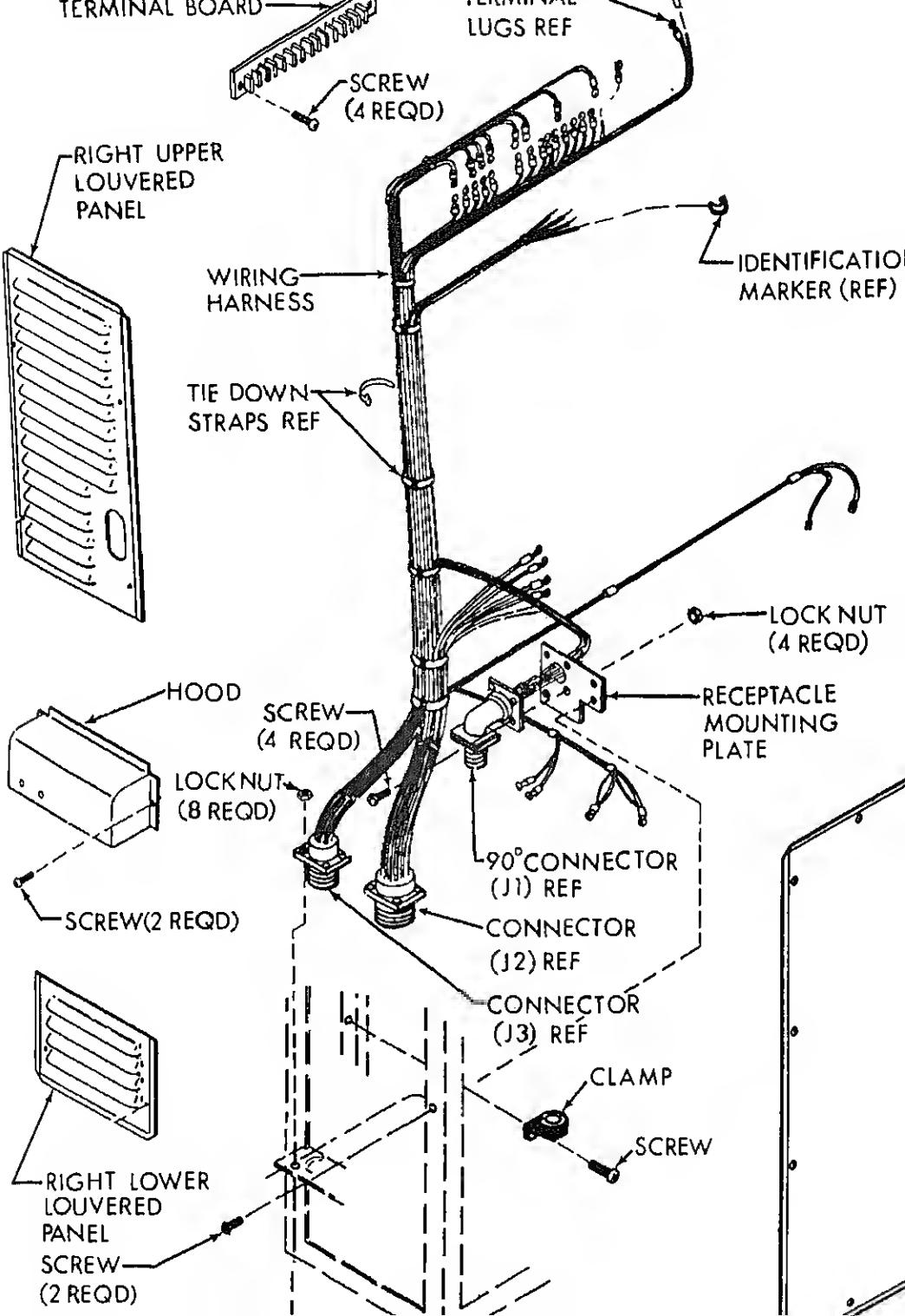
ELECTRICAL WIRING (CONDENSER SECTION)

(Figure 4-10).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

Access. Remove the following outside panels.



Inspect connectors for damage and loose or broken pins. Replace if defective.

Check individual wires for loose solder connections, loose terminal lugs, cut or frayed insulation, or broken wires. Repair or replace if defective.

Check terminal board for cracks and breaks. Replace if defective.

Using wiring diagram in figure 4-5, check individual wires for continuity. If continuity is not indicated, check solder and terminal lug connections and condition of wire. Repair all bad solder connections and replace all damaged wires.

Repair or Replace. Preferred repair methods consist of replacing wires, terminals, connectors, etc., rather than splicing wires, bending ends to form terminals, and other makeshift procedures, although the latter may be appropriate for emergency field repairs. Determine the proper size and length of wire, terminal connector to be used for replacement by referring to Table 4-4, Wire List, and to the wiring diagram (figure 4-7).

Soldering Connections. Wire connections must be made mechanically sound before they are soldered; solder alone does not provide sufficient strength to prevent breakage. Joining surfaces and connections to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-4995, Type I, resin-alcohol flux, and should be brushed onto the joint before soldering. If a flux-core solder is used, it should always be resin-core electrical solder. If an uncored solder is used, it should be a lead-tin solder conforming to Specification QQ-S-571. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive buildup of solder globs on the joint should be avoided or removed.

TABLE 4-4 WIRE LIST CONDENSER SECTION

Ident. No. (Marketing)	TERMINATION		TERMINATION		Awg Wire Size
	From	Terminal Type	To	Terminal Type	
WIRING HARNESS CONDENSER SECTION					
1					
2	TB1-1	MS25036-106	J2-A	MS3102R22-19S	16
2	TB1-2	MS25036-106	J2-B	MS3102R22-19S	16
3	TB1-3	MS25036-106	J2-C	MS3102R22-19S	16
4	TB1-9	MS25036-106	J1-C	13211E4742 (97403)	16
5	TB1-10	MS25036-106	J2-K	MS3102R22-19S	16
6	TB1-11	MS25036-106	J2-M	MS3102R22-19S	16
7	TB1-11	MS25036-106	J3-B	MS3102R18-4P	16
8	S6-2	41532 (00779)	J2-G	MS3102R22-19S	16
9	J1-B	13211E4742 (97403)	J2-J	MS3102R22-19S	16
10	TB1-12	MS25036-106	J2-P	MS3102R22-19S	16
11	TB1-12	MS25036-106	J3-C	MS3102R18-4P	16
12	TB1-10	MS25036-106	J3-A	MS3102R18-4P	16
13	TB1-13	MS25036-106	J2-D	MS3102R22-19S	16
14	TB1-13	MS25036-106	J3-D	MS3102R18-4P	16
15	J2-H	MS3102R22-19S	J1-A	13211E4742 (97403)	16
19	C2	41532 (00779)	TB1-3	MS25036-106	16
20	CR1-1	—	TB1-8	MS25036-106	16
21	CR1-2	—	TB1-9	MS25036-106	16
24	CR1-4	—	TB1-13	MS25036-106	16
25	F1	—	TB1-11	MS25036-106	16

Ident. No. (Marking)	TERMINATION From	TERMINATION Terminal Type	TERMINAL TYPE	Awg Wire Size	
WIRING HARNESS CONDENSER SECTION (Continued)					
CLOSE WIRE CONDENSER SECTION					
26	K1-J	41532 (00779)	TB1-5	MS25036-106	16
	K1-L	41532 (00779)	TB1-4	MS25036-106	16
	K1-M	41532 (00779)	TB1-13	MS25036-106	16
29	K1-M	41532 (00779)	C3	41532 (00779)	16
30	B2-3	MS25036-106	TB1-1	MS25036-106	16
31	B2-R	41532 (00779)	TB1-5	MS25036-106	16
32	B2-S	41532 (00779)	TB1-4	NS25036-106	16
33	C4	41532 (00779)	B2-S	41532 (00779)	16
34	C4	41532 (00779)	B2-R	41532 (00779)	16
35	K1-S	41532 (00779)	C3	41532 (00779)	16
98	S6-1	41532 (00779)	TB1-8	MS25036-106	16
36	CR1-4	—	GRD	MS25036-153	16

Joint to be insulated, and slide the tubing over the wire before making the joint. After made, slide the tubing over the joint, and shrink in place with moderate heat.

- (3) Splicing Wires. To repair broken or cut wires that are otherwise sound, the mating ends are stripped and spliced. A commercial butt splice can be crimped onto the ends to join them. A Union wire splice can be made. The latter is made by stripping 1-1/4 inch (3.18 cm) of insulation from the wire ends, holding the ends parallel and facing opposite directions, then twisting around the other wire at least three turns. Solder and apply insulation as described.
- (4) Crimping Terminals. To install a terminal on the end of a wire, strip 1/4 to 1/2 inch (0.64 to 1.27 cm) of insulation from the end of the wire, apply a one-inch (2.54 cm) piece of heat-shrink tubing (the terminal is of the uninsulated type), and insert wire-end into the shank of the terminal. Crimp the terminal and install heat-shrink tubing if necessary.

e. Reassembly. Reinstall the following outside panels.

- (1) Attach the hood with two machine screws.
- (2) Reinstall the right upper louvered panel, the right lower louvered panel and the rear louvering the panel and engaging the 1/4 turn stud fasteners.

4-14. FUSE (CONDENSER SECTION)

- a. Inspection of installed items (figure 4-11). The circuit from the power supply connector contains fuse F1.
 - (1) Remove rear panel from condenser section.
 - (2) Observe indicator cap on fuse holder. If this fuse is burned out, the cap which contains the indicator will light until the defective fuse is replaced.

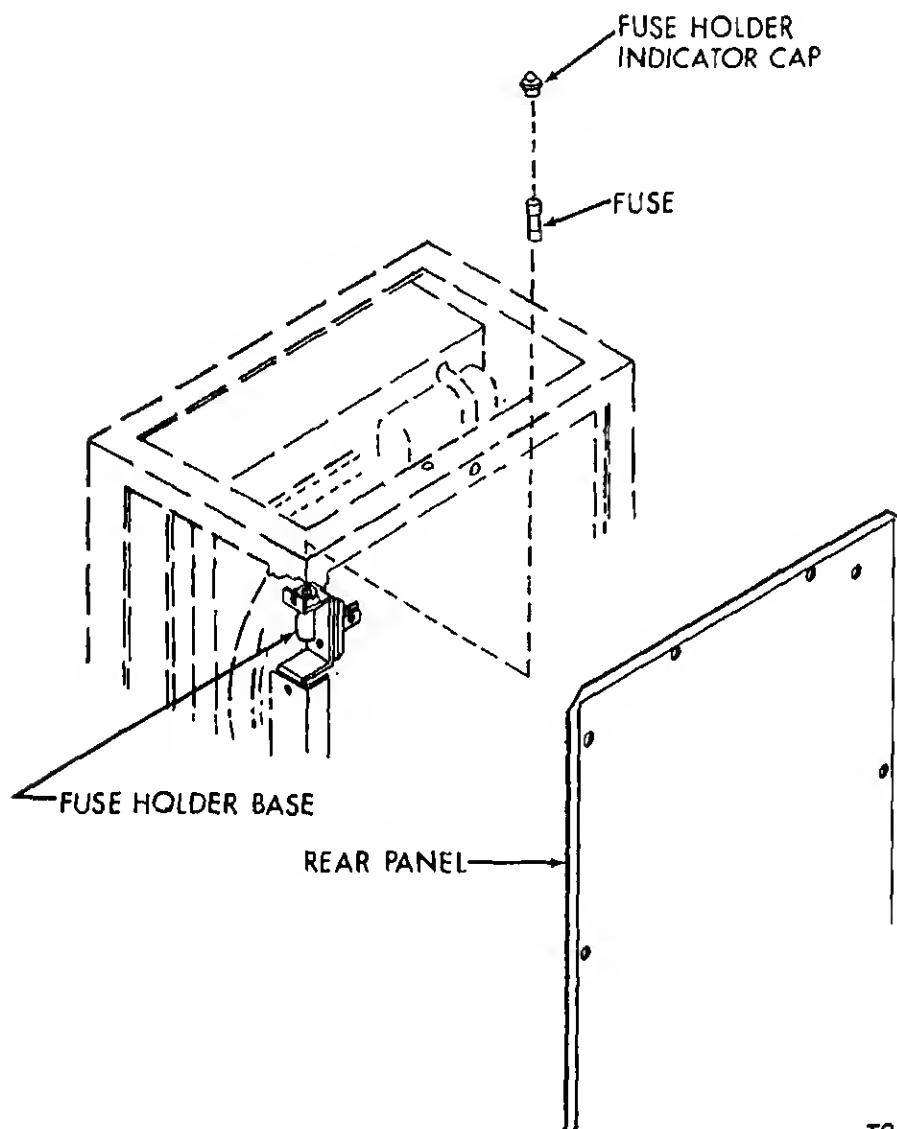
WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

- b. Removal.
 - (1) Disconnect power.
 - (2) Push in on indicator cap, turn counterclockwise and remove cap.
 - (3) Remove fuse and check for melted or broken element. If the fuse is defective, replace it.
- c. Installation.
 - (1) Place fuse in fuse holder.
 - (2) Replace indicator cap.

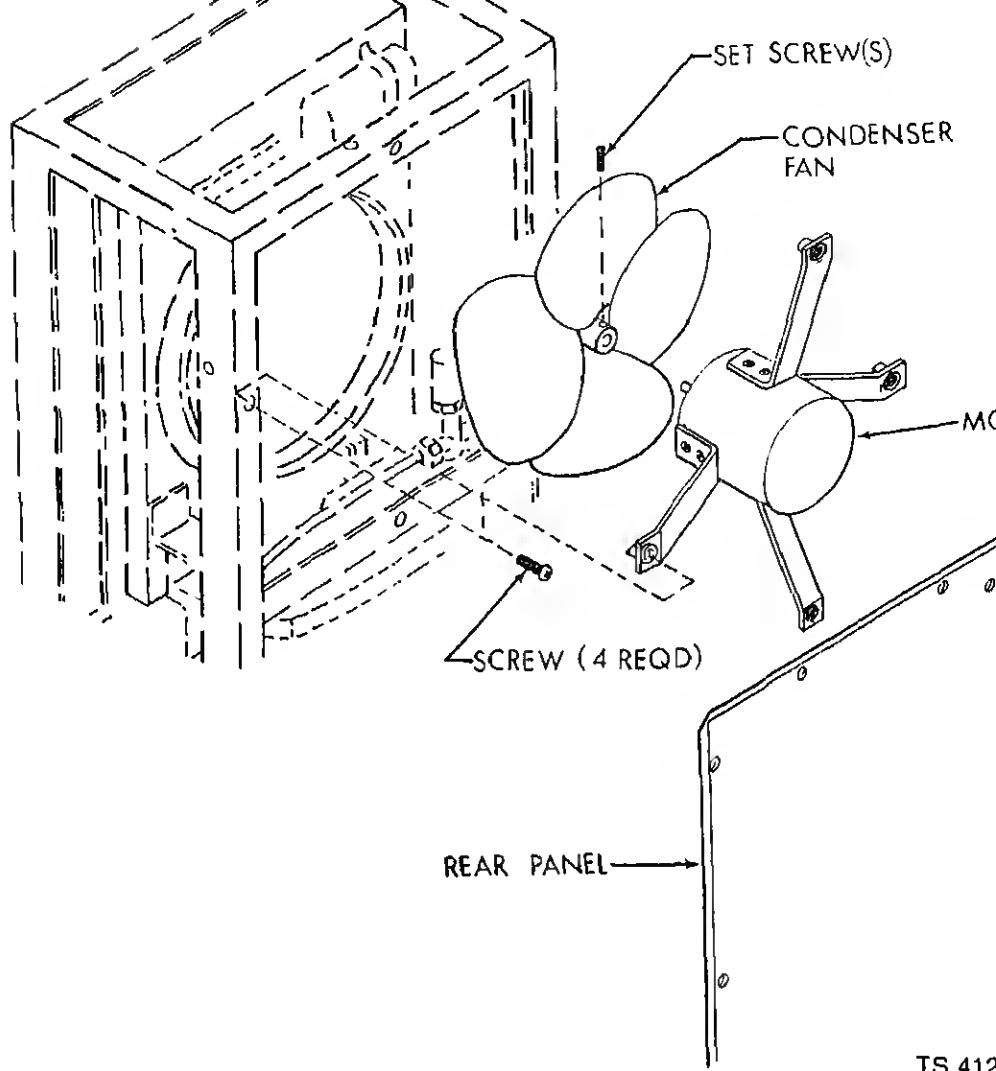
(4) Observe indicator cap. If fuse is good, the lamp in the cap will not light.

(5) Install the rear panel.



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Figure 4-11. Fuse, Condenser Section.



TS 412

Figure 4-12. Condenser Fan.

WARNING

Disconnect power from the air conditioner before performing maintenance on components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Remove the rear panel.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Wipe the fan blades with a clean cloth dampened slightly with dry cleaning solvent (Fed Spec P-D-680) and dry thoroughly.

Inspection. Check the fan for breaks, cracks, dents, loose rivets and bent or otherwise deformed blades. Replace the condenser fan if it is defective.

Installation.

-) Slip the fan onto the motor shaft with hub facing the motor end approximately 1/2 inch (1.27 cm) shaft extending through the hub. Align the setscrews with the flat surfaces on the motor shaft.
-) Tighten the setscrew(s).
-) Carefully position the fan and motor assembly in the unit.
-) Install the four screws and check fan for clearance by spinning the fan by hand. Clearance between the blade tips and fan shroud should be even. If necessary, loosen the screws and adjust clearance.
-) Install the rear panel.
-) Connect power to the unit.

CONDENSER FAN MOTOR

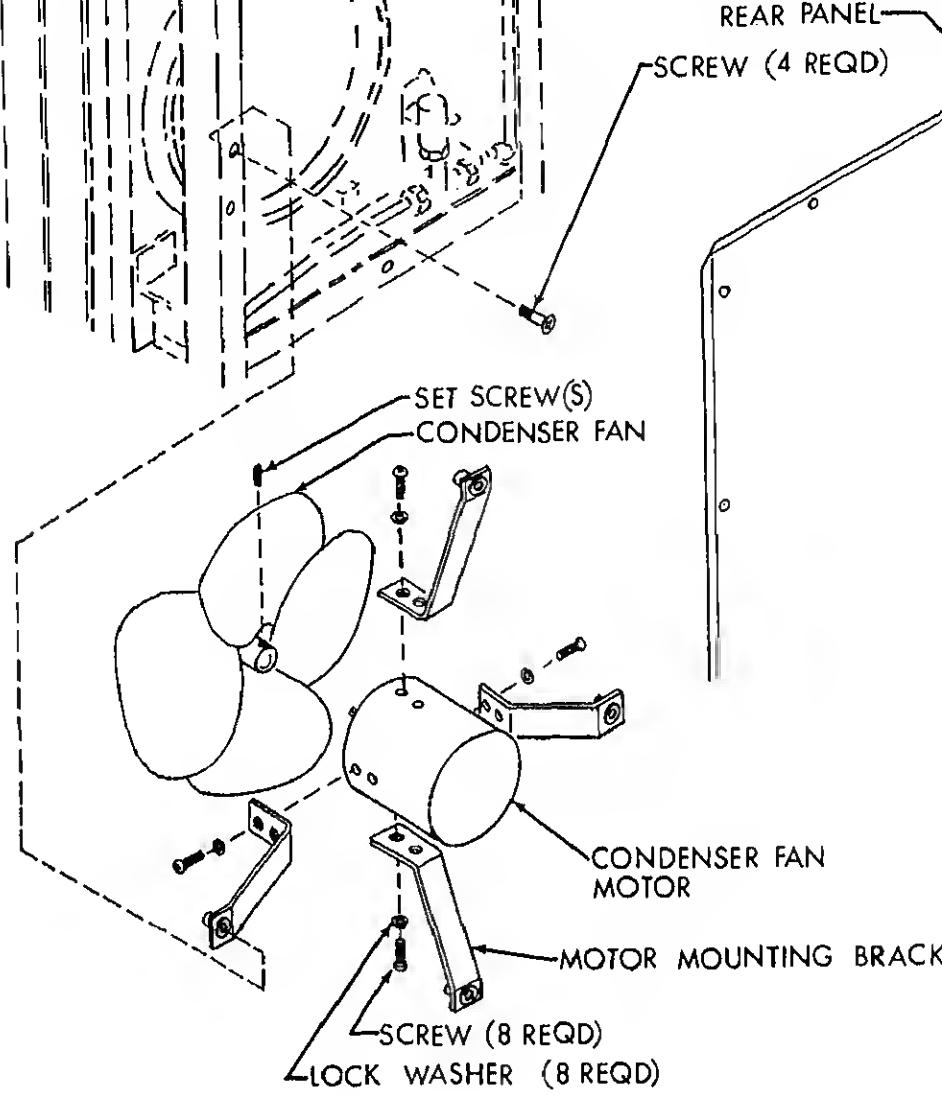
(figure 4-13).

remove.

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

-) Disconnect power.
-) Remove the rear panel.
-) Tear and disconnect the motor leads from the terminal board and the capacitor.
-) Remove the four screws that attach the motor mounting brackets to the frame.
-) Carefully remove the motor and fan assembly from the unit.



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Figure 4-13. Condenser Fan Motor.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Cleaning. Wipe the motor and the other disassembled parts with a clean cloth dampened slightly with cleaning solvent (Fed Spec P-D-680) and dry thoroughly.

Inspection.

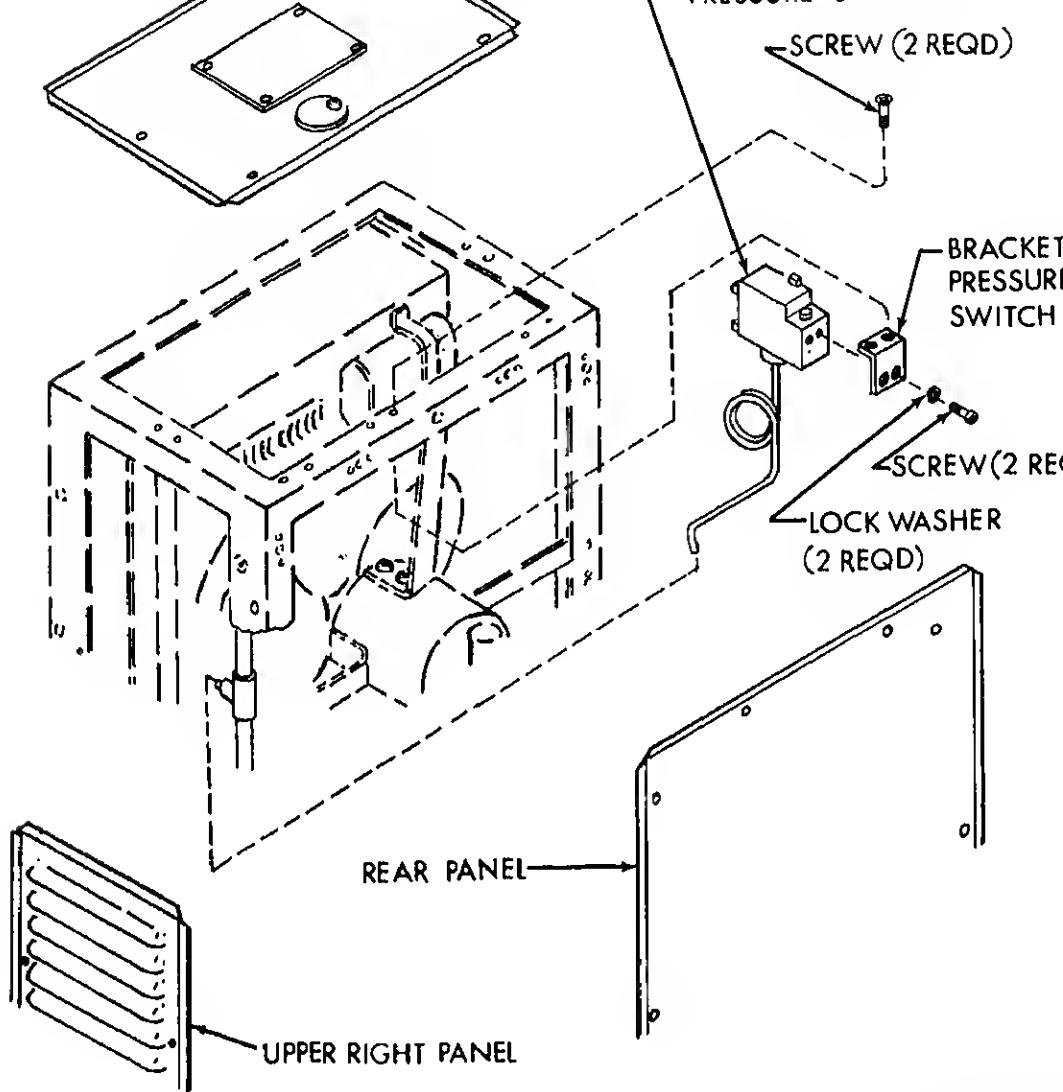
- 1) Check the motor for dents, cracks, condition of threads in mounting holes, loose or damaged wires and free rotation of motor shaft. If a defect is found that could cause the unit to malfunction, replace the motor.
- 2) Check the fan for breaks, cracks, dents, loose rivets and bent or otherwise deformed fan blade. Replace the fan if it is defective.
- 3) Check the mounting brackets for breaks, cracks, dents and condition of threads in blind nuts. Repair minor damage using conventional sheet metal repair methods. Replace damaged blind nut or bracket if damage indicates replacement.

Testing.

- 1) Using a continuity tester, check for continuity between motor leads. If a lack of continuity is shown, an open winding is indicated. Replace the motor.
- 2) Check for continuity between the red lead and the motor frame. If there is continuity, one of windings is shorted to ground. Replace the motor.

Installation.

- 1) Attach the motor mounting brackets to the motor with eight screws and lock washers. Take care to strip the threads in the aluminum motor housing. The two identical brackets go to the sides, longest bracket to the top and the shorter bracket to the bottom.
- 2) Slip the fan onto the motor shaft with the hub facing the motor and approximately 1/2 inch (1.27 cm) of shaft extending through the hub. Align the setscrew(s) with the flat surfaces on the motor shaft and tighten the setscrew(s).
- 3) Carefully position the fan and motor assembly in the unit.
- 4) Install the four screws and check fan for clearance by spinning the fan by hand. Clearance between the blade tips and the fan shroud should be even. If necessary, loosen the mounting bracket screws and adjust the clearance.
- 5) Connect the motor leads to the terminal board and capacitor. See tags on removed motor and wiring diagram, figure 4-7.
- 6) Install the rear panel.
- 7) Connect power to the unit.



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Figure 4-14. Pressure Switch

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

. Inspection of installed items.

- (1) Disconnect power.
- (2) Check for loose terminals, missing mounting hardware, cracks, breaks or other defects. Replace defective parts.

. Replacement. When it is necessary to replace the pressure switch, report condition to maintenance (paragraph 5-4).

. Cleaning. Wipe the pressure switch with a clean, dry, lint free cloth.

If operational check and inspection indicated that parts were acceptable, replace the top, upper panels and connect power.

18. RECTIFIER (CONDENSER SECTION) (figure 4-15).

Rectifier CR1 is required to transform alternating current into direct current for the control circuit. It is located on the fuse bracket in the condenser section.

. Access. Remove the upper right panel and the rear panel.

WARNING

The following test must be conducted with the power on. Exercise extreme caution.

. Operational check.

- (1) Place power switch SW2 in ON position.
- (2) With a voltmeter, check for input voltage of 115 volts ac. With the proper input voltage, output of 103 volts dc. Refer to figure 4-7, wiring diagram. Replace the rectifier if it is

. Removal.

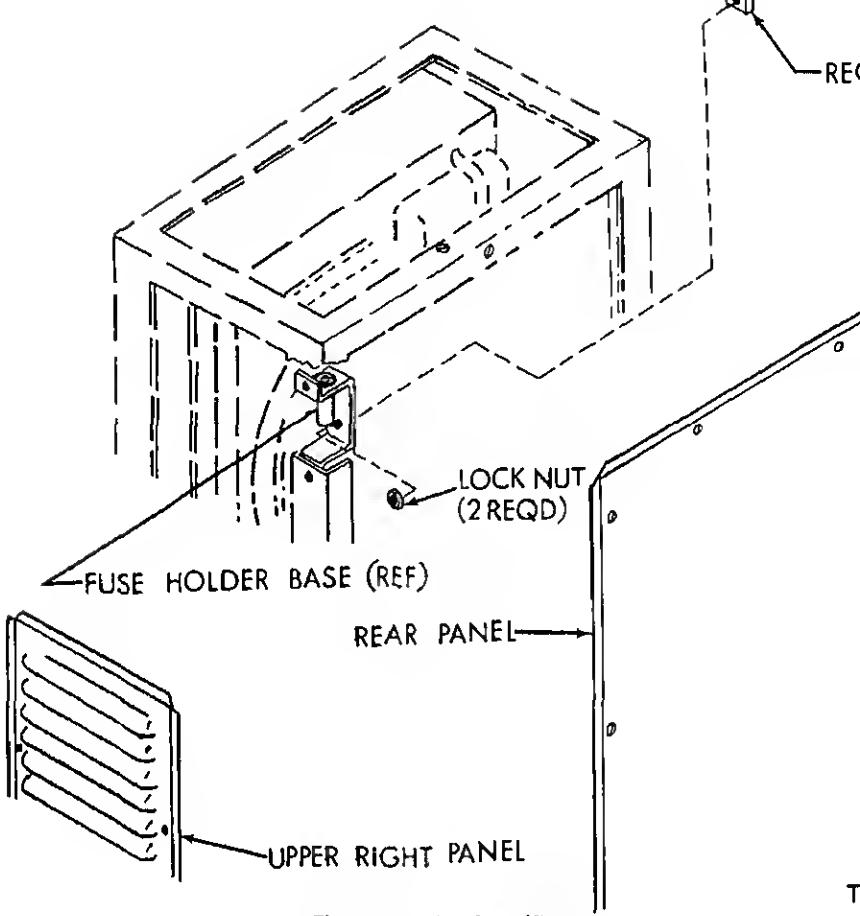


Figure 4-15. Rectifier

WARNING

Disconnect power from the air conditioner before performing maintenance components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Tag and unsolder wire leads.
- (3) Remove the two screws and nuts.
- (4) Remove the rectifier.

d. Installation.

- (1) Install the rectifier using two screws and nuts.

REFRIGERANT PIPING. (CONDENSER SECTION)

(figura 4-16).

ccess. Remove the top, upper right and rear panels and the hood.

spection of installed items. Inspect tubing and fittings visually for nicks, cuts, cracks, dents and kinks. If damage appears minor, test for leaks. If no leaks are detected and dents and kinks are not severe enough to limit refrigerant flow, consider the tubing serviceable. If a leak or severe dent or kink is found, report to direct support maintenance for repair or replacement.

esting. Test by one of the following methods.

CAUTION

The electronic leak detector is sensitive to the presence of refrigerant gas in the atmosphere. When refrigerant gas is present in the atmosphere of the work area, false indications can result. Use in a well ventilated but draft-free area.

-) Electronic Leak Detector. Turn the electronic unit on, and slowly pass the probe around all parts of the refrigeration system where a leak could exist. Depending upon the type of detector used, a signal will be indicated by an audible signal, a light, or by meter deflections.
-) Soap Solution. Brush soap solution on all possible points of leakage, and watch for bubbles. Use a definite sequence to avoid missing any points that should be tested. Wipe the solution from joints, and mark any point at which a leak is found.

replacement. If test results show any leaks, mark the location and report to direct support maintenance.

SERVICE VALVE. (CONDENSER SECTION)

A service valve and line shutoff valve can be used to check pressure or to add refrigerant to the system through the line (figure 4-16).

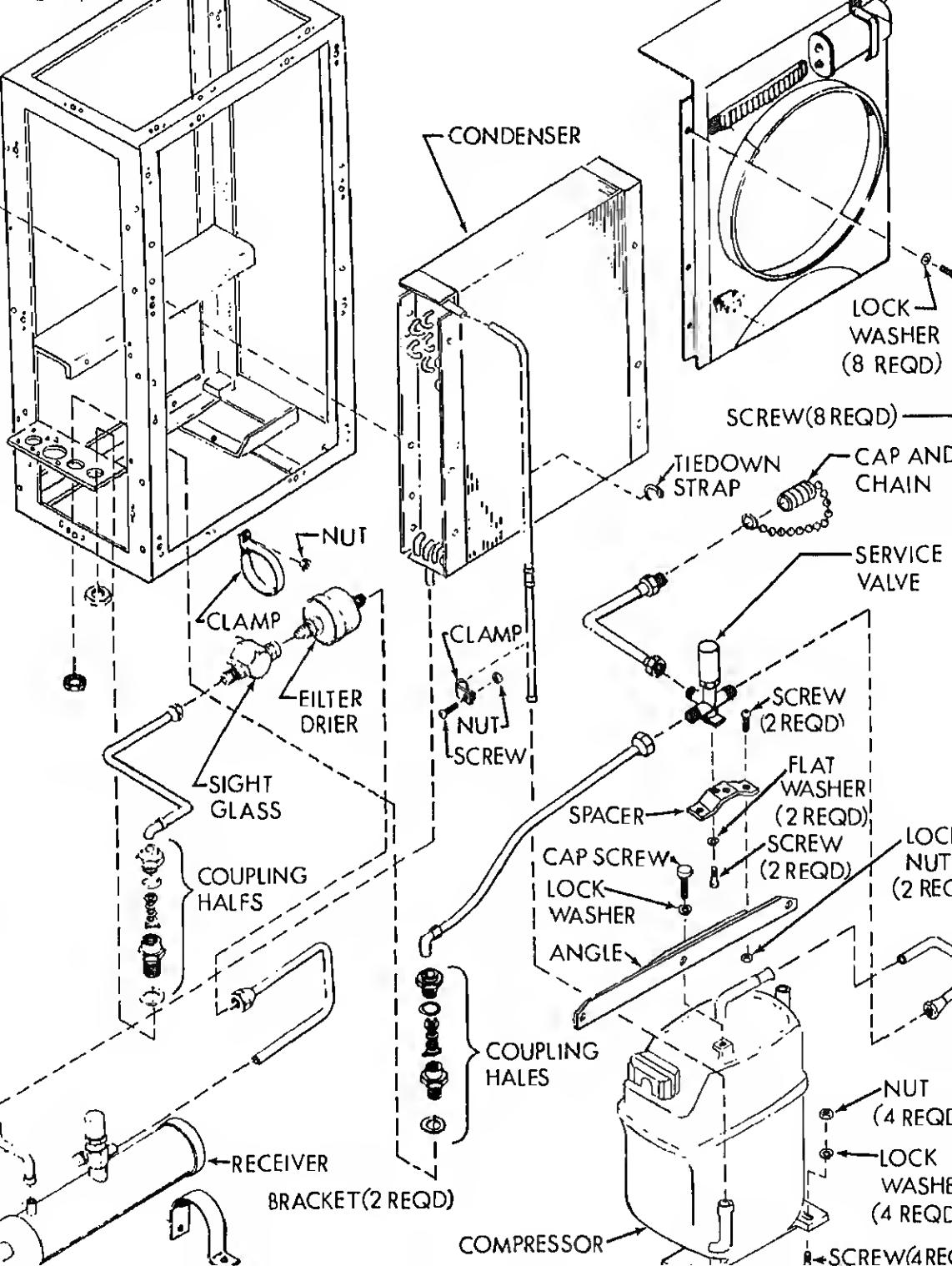
ccess. Remove rear panel.

spection/Test of Installed Items.

-) Inspect to be sure the caps are in place on the valve stem and the charge connection port.
-) Test for leaks. See paragraph 4-19c.

replacement. If test results show any leaks, mark location and report to direct support maintenance.

Install the rear panel.



Access. Remove hoods and upper panels above hoods from both sections.

Inspection of installed items. Check couplings for cracks, breaks, corrosion and loose connections.

Test for leaks. See paragraph 4-19c.

Replacement. If inspection or test results show any leaks or defects, mark location and report to direct support maintenance.

Install hoods and upper panels above the hoods.

2. COMPRESSOR. (CONDENSER SECTION)

is the hermetically sealed type of compressor. It contains a compressor-motor assembly equipped with thermal-overload protection to prevent motor operation above its rated safe operating temperature. See figure 2-1.

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

a. Access. Remove the intake air grille, the left side and the rear panels.

b. Inspection of installed items. Inspect for dents, corrosion, breaks, cracks and loose or missing mounting hardware.

c. Cleaning.

WARNING

Dry cleaning solvent (Fed Spac P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38° to 59°C).

e. Clean the exterior surface of the compressor with a clean cloth dampened slightly with dry cleaning solvent (Fed Spac P-D-680) and dry thoroughly.

d. Testing.

- (1) Check compressor overload protector for an open circuit between terminals 1 and 3 with a continuity tester.
- (2) Reset pressure switch by depressing reset button on top panel of condenser section as necessary. There is an open circuit. Refer to direct support maintenance.
- (3) Test terminals S, R and C for continuity with a continuity tester. The compressor must be repaired if there is an open circuit. Refer to direct support maintenance.

(5) If any damage is evident test for leaks using one of the methods listed in paragraph 4-22.

- Replacement. Refer to direct support maintenance.
- Install the intake air grille, and the left side and rear panels.

4-23. COMPRESSOR START CAPACITOR. (CONDENSER SECTION)

(figure 4-17).

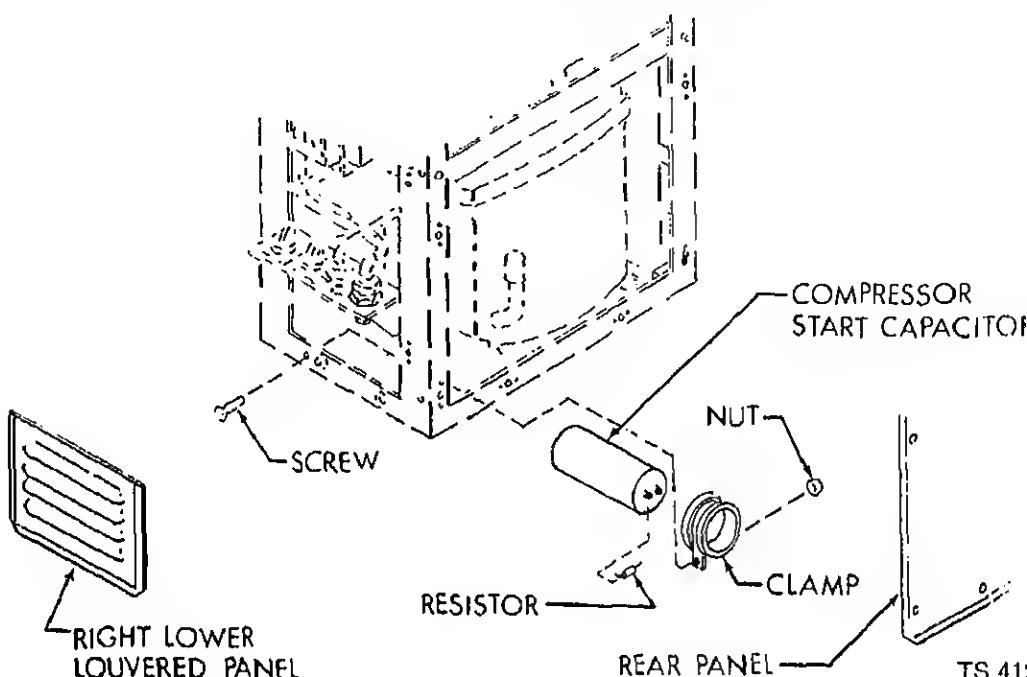


Figure 4-17. Compressor Start Capacitor.

WARNING

Disconnect power from the air conditioner before performing maintenance on components. The voltage used can be lethal.

- Remove.
 - Disconnect power.
 - Remove the right lower louvered panel and the rear panel.

WARNING

(5) Remove the capacitor.

b. Cleaning. Wipe capacitor with a clean dry cloth.

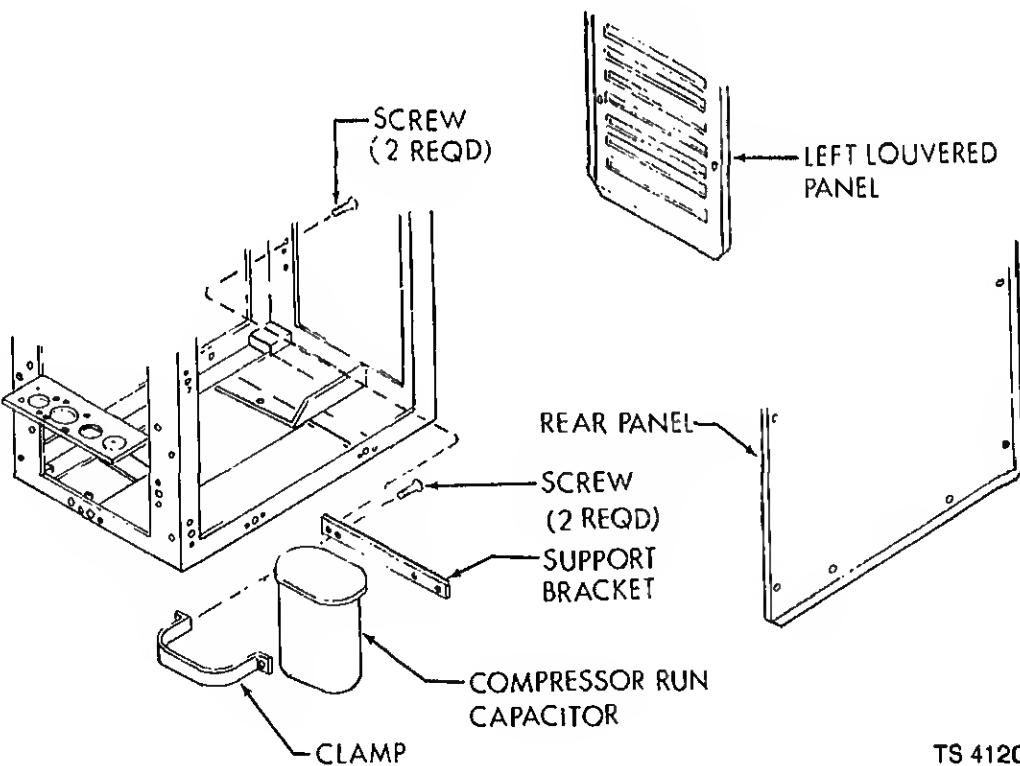
c. Testing. Test a suspected defective capacitor with a capacitance tester. Replace if found bad. If a capacitance tester is not available, refer to direct support.

d. Installation.

- (1) Install capacitor using clamp, screw and nut.
- (2) Connect the leads. See figure 4-7, wiring diagram.
- (3) Install the right lower louvered panel end rear panel.
- (4) Connect power.

-24. COMPRESSOR RUN CAPACITOR. (CONDENSER SECTION)

(figure 4-18).



WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

a. Removal.

- (1) Disconnect power.
- (2) Remove the left louvered panel and the rear panel.

WARNING

Discharge capacitor before touching the two terminals.

- (3) Tag and disconnect the leads.
- (4) Disconnect the clamp holding the capacitor to the support bracket by removing two screws.
- (5) Remove the capacitor.

b. Cleaning. Wipe capacitor with a clean dry cloth.

c. Testing. Test a suspected defective capacitor with a capacitance tester. Replace if found to be faulty. If a capacitance tester is not available, refer to direct support.

d. Installation.

- (1) Position the capacitor and clamp and attach with two screws.
- (2) Connect the leads. See figure 4-7, wiring diagram.
- (3) Install the left louvered panel and the rear panel.
- (4) Connect power.

4-25. CONDENSER FAN MOTOR RUN CAPACITOR (CONDENSER SECTION)

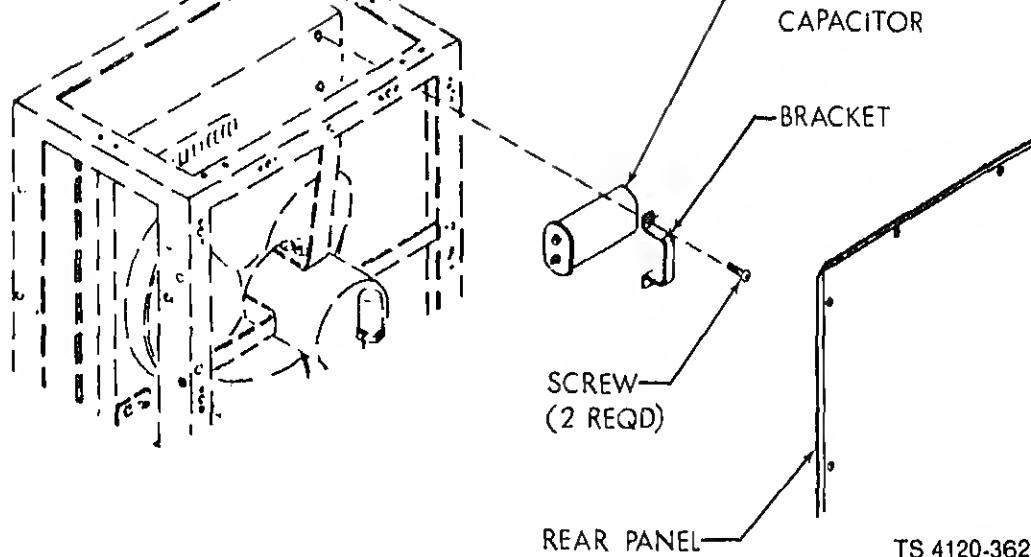
(figure 4-7)

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

a. Removal.

- (1) Disconnect power.



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Figure 4-19. Condenser Fan Motor Run Capacitor

WARNING

Discharge capacitor before touching the two terminals.

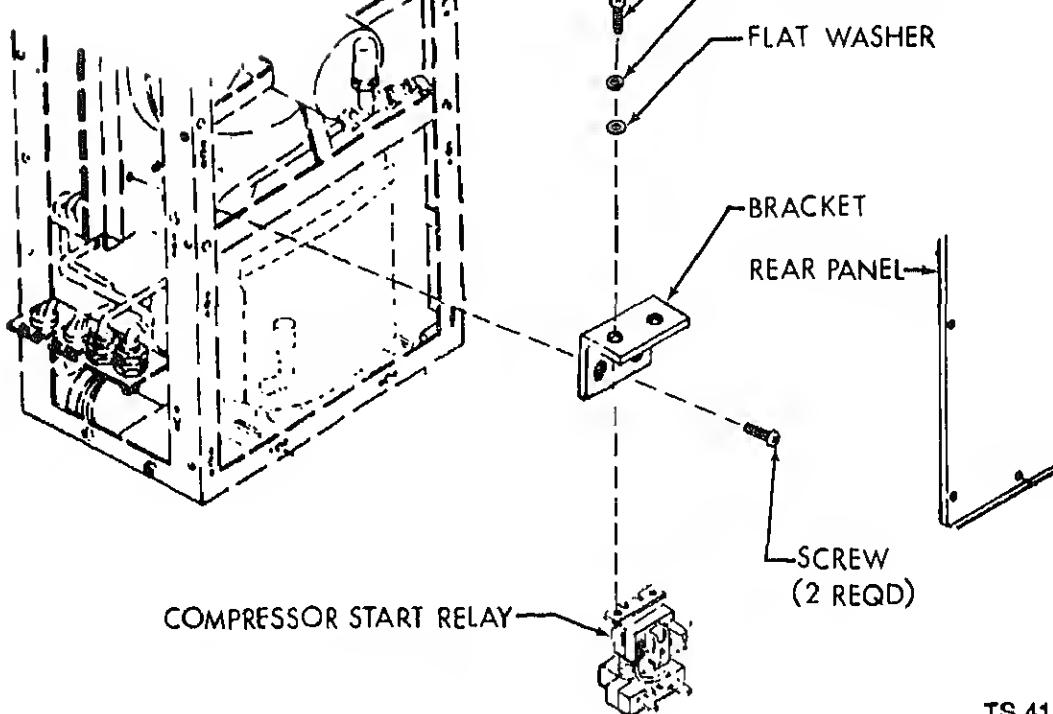
- (3) Tag and disconnect the leads.
- (4) Loosen or remove the two screws and the bracket.
- (5) Remove the capacitor.

b. Cleaning. Wipe capacitor with a clean dry cloth.

c. Testing. Test a suspected defective capacitor with a capacitance tester. Replace if found bad. If a capacitance tester is not available, refer to direct support.

d. Installation.

- (1) Clamp the capacitor in place using the two screws and the bracket.
- (2) Connect the leads. See figure 4-7, wiring diagram.
- (3) Install the rear panel.
- (4) Connect power.



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Figure 4-20. Compressor Start Relay.

WARNING

Disconnect power from the air conditioner before performing maintenance on components. The voltage used can be lethal.

- a. Access.
 - (1) Disconnect power.
 - (2) Remove the rear panel.
- b. Inspection/Teating of Installed Items.
 - (1) Inspect for breaks, cracks, corrosion, rust and loose connections.
 - (2) Place the probes of a continuity checker on terminals 5 and 13 on the terminal block to check for continuity. For reference, see wiring diagram, figure 4-7.

WARNING

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Tag end disconnect the wire leads.
- (3) Remove two each of screws, lock washers and flat washers.
- (4) Remove the compressor start relay.

d. Installation.

- (1) Install the compressor start relay with two each of screws, lockwashers and flat washers.
- (2) Connect the wire leads. See figure 4-7, wiring diagram.
- (3) Install the rear panel.
- (4) Connect power.

4-27. SIGHT GLASS. (CONDENSER SECTION) (figure 4-16).

The sight glass is located under the condenser just behind the condenser Intake grille. The liquid refrigerant is seen through this glass when the unit is in the cooling mode.

e. Access. Remove the intake air grille (figure 4-8).

b. Inspection/Test of installed items.

- (1) Inspect for cracked or broken glass, leaks and corrosion. If glass is cracked or broken, refer to direct support maintenance.
- (2) If a leak is indicated, test per paragraph 4-19c.

c. Replacement. If inspection/test results indicate replacement, refer to direct support maintenance (figure 5-9).

d. Install the Intake air grille.

4-28. RECEIVER. (CONDENSER SECTION) (figure 4-16).

The receiver consists of a steel container for collecting the high pressure liquid refrigerant from the condenser. The valve on top of the receiver can be used for releasing the refrigerant charge. The valve must be泄压 (vented) before operating the unit.

a. Access. Remove the intake air grille. See figure 4-8.

(3) Make sure valve stem cap is ON.

(4) If a leak is indicated, test per paragraph 4-19c.

Replacement. If inspection/test results indicate replacement, refer to direct support maintenance (para 5-11).

Install the intake air grille.

9. CONDENSER COIL. (CONDENSER SECTION)

(figure 4-16).

coil consists of copper tubing and has aluminum fins which transfer heat from the refrigerant to the air.

Access (figures 4-8 and 4-9). Remove the following grilles and panels, discharge air grille, right upper louvered panel, left louvered panel and the rear panel.

Inspection/Test of Installed items.

(1) Check for accumulated dirt. Clean if an accumulation of dirt is evident.

(2) Check fins for dents, bent edges or any condition that would block or distort air flow. Straighten damaged fins with a plastic fin comb.

(3) If a leak is indicated, test per paragraph 4-19c.

WARNING

Compressed air used for cleaning purposes will not exceed 30 PSI.

Cleaning. Clean coil with a soft bristled brush, or use compressed air at 30 psi or less from the inlet side of the coil to blow the dirt out. Take care to avoid fin damage.

Repair/Replacement. If inspection/test results indicate repairs or replacement, refer to direct support maintenance (para 5-12).

Install the following grilles and panels, discharge air grille, right upper louvered panel, left louvered panel and the rear panel.

10. FRAME. (CONDENSER SECTION)

Access. Remove all panels, grilles and the hood. See figures 4-8 and 4-9.

Inspection/Test of installed item.

(1) Check for missing, loose or damaged hardware. Replace all hardware found missing or defective.

(2) Inspect for dents, bends and cracked or broken welds. Refer defective condition to direct support maintenance.

orator section is housed within metal panels and adjustable grilles or louvers. Quick release 1/4 turn stud fasteners are used to secure the panels. The hood is retained by standard machine screws.

Remove the panels that have quick release 1/4 turn stud fasteners by turning the fasteners counter-clockwise and pulling the panel outward.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personal and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) to 138°F (59°C).

Cleaning. Clean the panels with a cloth dampened with a detergent solution or dry cleaning solvent (Fed Spec P-D-680). Use a soft brush if necessary to dislodge caked on dirt. Dry the items thoroughly.

Inspection/Repair. Inspect panels for breaks, cracks, dents, loose or missing mounting hardware or other defects. Repair breaks, cracks and dents using conventional steel metal repair methods. Replace mounting hardware and panels damaged beyond repair. Inspect the identification plate rivets to make sure all rivets are present. If any rivet is missing, replace it. If you cannot read all of the information shown on the plate, inspect gasket material, using the following procedure:

Remove as much old gasket material as possible by pulling or scraping it away from the metal surfaces.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

Soften and remove old adhesive and gasket residue, using acetone or methyl-ethyl ketone (MEK) and a stiff brush.

Coat the metal surfaces of the metal and the gasket with adhesive. Let both surfaces dry. The adhesive is tacky but will not stick to the fingers.

Starting with an end, carefully attach the gasket to the metal. Press into firm contact all over the gasket. If either touch up or refinishing is necessary, see TM43-0139.

Installation.

If the identification plate was removed, reinstall with rivets.

If the electrical connector covers were removed, reinstall with rivets.

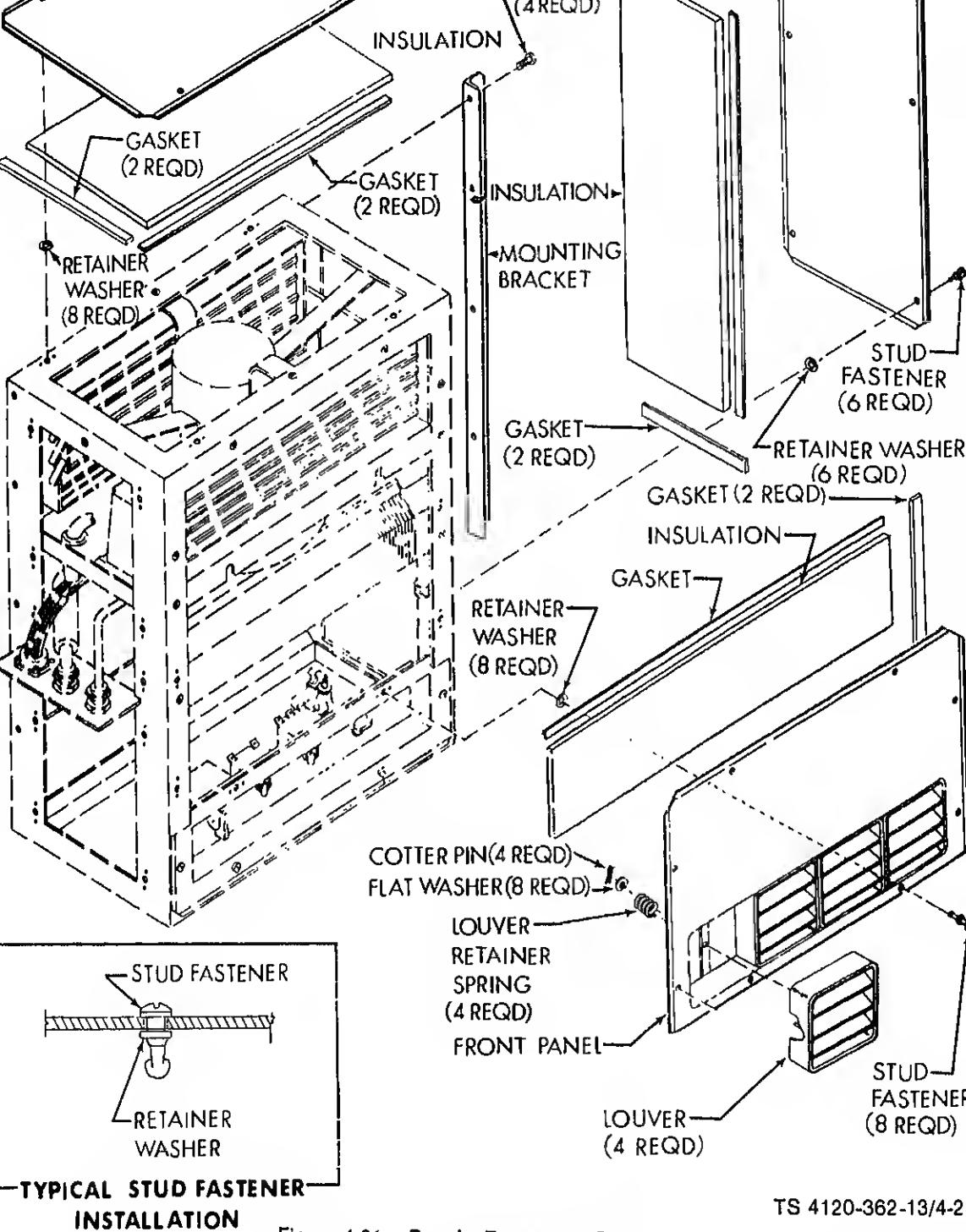


Figure 4-21. Panels, Evaporator Section
(Top, Right Side and Front)

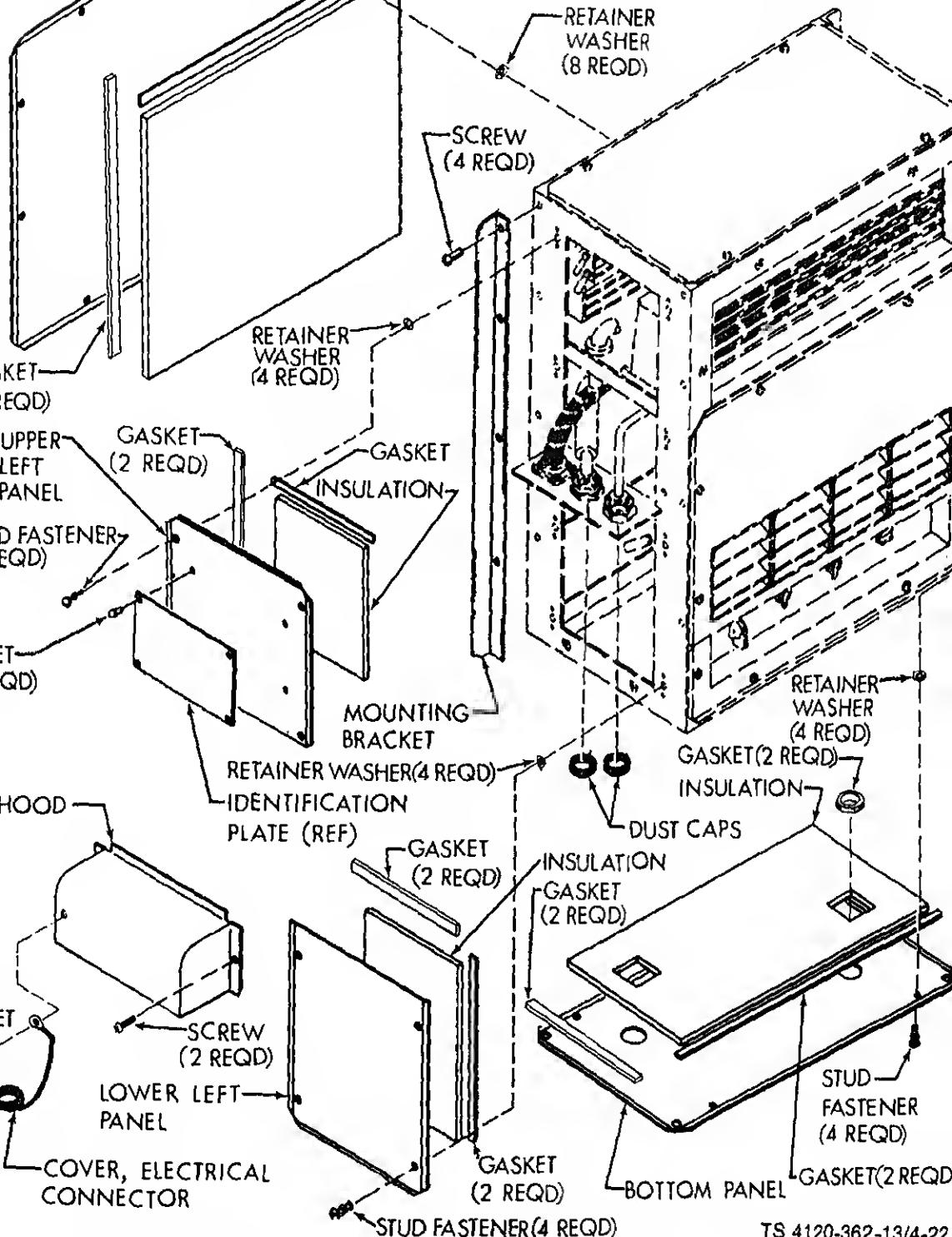


Figure 4-22. Panels and Hood. Evaporator Section

TS 4120-362-13/4-22

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

e. Access. See figures 4-21 and 4-22.

- (1) Disconnect power.
- (2) Remove the following outside panels: top panel, right side panel, front panel, upper and the back panel.
- (3) Remove the hood by unscrewing two machine screws.
- (4) Release the 1/4 turn studs on the control panel and carefully pull the control panel out gain access to the wire connections on the back side of the panel.

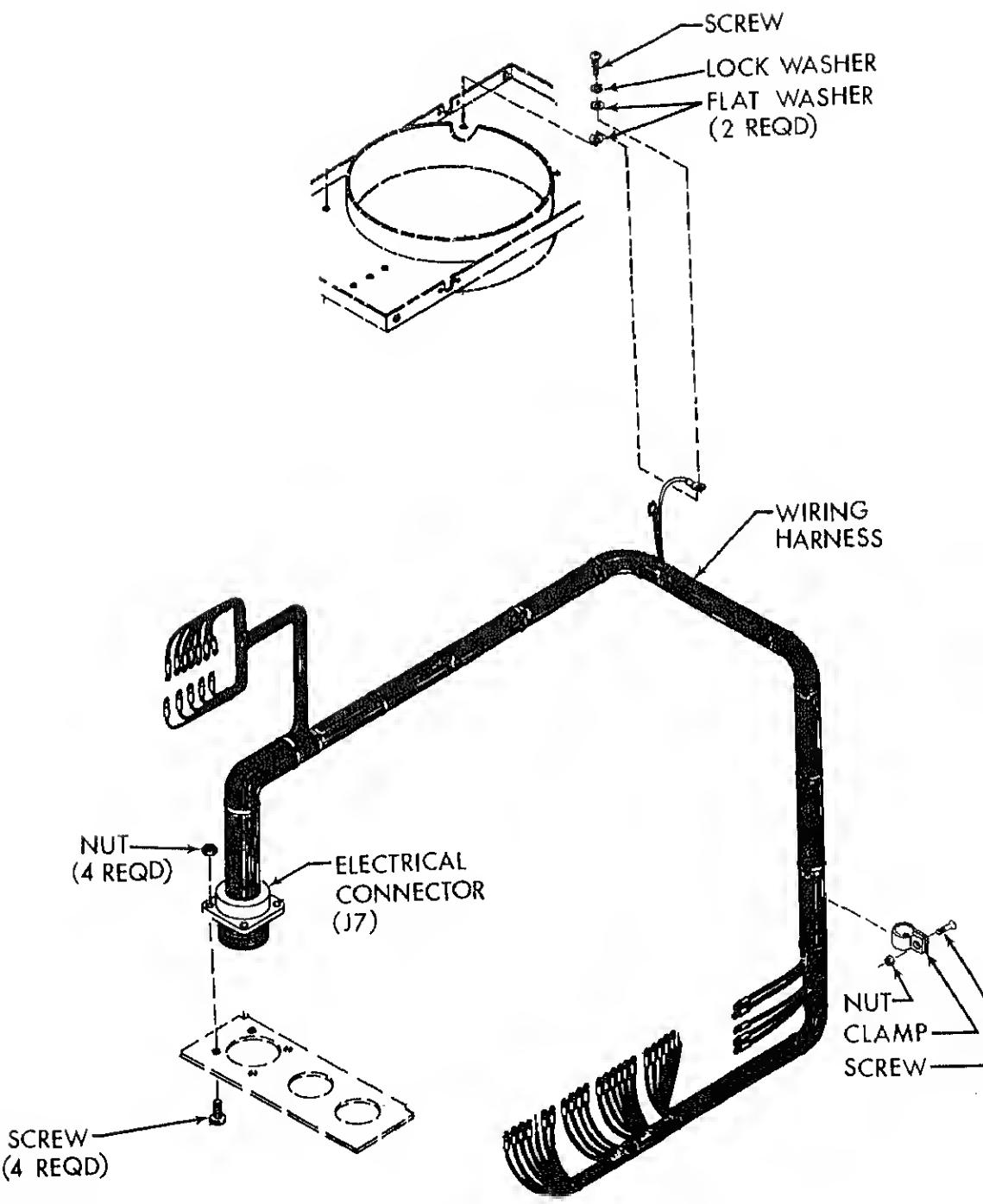
b. Inspection.

- (1) Inspect connector for damage and loose or broken pins. Replace if defective.

c. Testing. Using wiring diagram in figure 4-5, check individual wires for continuity. If indicated, check solder end terminal lug connections and condition of wire. Repair all connections and replace all damaged wires.

d. Repair or Replace. Preferred repair methods consist of replacing wires, terminals, connectors, then splicing wires, bending ends to form terminals, and other make shift procedures, although may be appropriate for emergency field repairs. Determine the proper size and length of wire connector to be used for replacement by referring to Table 4-5, Wire List, and to the wiring (figure 4-7).

- (1) Soldering Connections. Wire connections must be made mechanically sound before soldered; solder alone does not provide sufficient strength to prevent breakage. Joints to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-4995, Type I, resin-alcohol flux, and should be brushed onto the wires before soldering. If a flux-core solder is used, it should always be resin-core electrical solder. If a solder is used, it should be a lead-tin solder conforming to Specification QQ-S-571. It should always be heated to the point at which the solder will melt completely and flow into a joint. Excessive buildup of solder globbs on the joint should be avoided or removed.
- (2) Insulating Joints. The preferred method of insulating electrical joints is by the use of heat-shrink tubing. To apply, cut a piece of heat-shrink tubing of suitable diameter to a one-inch (2.54 cm) length, covering joints at terminals or connectors, or to a length about 1/2-inch (1.27 cm) longer than the joint to be insulated, and slide the tubing over the wire before making the joint. If a crimped joint is used, slide the tubing over the joint, and shrink in place with moderate heat.



WIRING HARNESS EVAPOR

65	J7-A	MS3102R22-19P	S3-9
66	J7-B	MS3102R22-19P	S3-6
67	J7-C	MS3102R22-19P	S3-3
68	J7-D	MS3102R22-19P	GRD
69	J7-G	MS3102R22-19P	K4-11
70	J7-H	MS3102R22-19P	S2-3
71	J7-J	MS3102R22-19P	K4-10
72	J7-K	MS3102R22-19P	S2-12
73	J7-M	MS3102R22-19P	S2-9
74	J7-P	MS3102R22-19P	S2-6
75	S2-11	MS25036-106	K4-2
76	S2-8	MS25036-106	K4-5
77	S2-5	MS25036-106	K4-8
78	S2-2	MS25036-153	S4-2
79	S4-1	MS25036-153	S3-12
80	S4-3	MS25036-153	S5-1
81	S5-2	MS25036-106	S3-10
82	S3-7	MS25036-106	HR1-6
83	S3-4	MS25036-106	HR1-2
84	S3-1	MS25036-106	HR1-1
85	S3-11	MS25036-106	K4-7
86	S3-8	MS25036-106	K4-3
87	S3-5	MS25036-106	K4-4
88	S3-2	MS25036-106	K4-9
89	K4-8	MS25036-106	C1
94	K4-11	MS25036-106	K4-6
95	HR1-1	MS25036-153	HR1-3
96	HR1-3	MS25036-153	HR1-5
97	HR1-2	MS25036-153	HR1-4

the wire ends, holding the ends parallel and facing opposite directions, then twisting each end around the other wire at least three turns. Solder and apply insulation as described above.

4) Crimping Terminals. To install a terminal on the end of a wire, strip 1/4 to 1/2 inch (0.66 to 1.27 cm) insulation from the end of the wire, apply a one-inch (2.54 cm) piece of heat-shrink tubing (if the terminal is of the uninsulated type), and insert wire-end into the shank of the terminal. Crimp the sharp end. Install heat-shrink tubing if necessary.

Reassembly.

- 1) Carefully position the control panel in place and engage the 1/4 turn stud fasteners.
- 2) Attach the hood with two machine screws.
- 3) Reinstall the following outside panels: two panel, right side panel, front panel, upper left panel and the back panel.
- 4) Connect power.

CONTROL PANEL. (EVAPORATOR SECTION)

(figure 4-24).

Control panel is located toward the bottom of the front of the evaporator section. It contains one mechanical switch and three electrical switches.

Inspection/Test of installed items. Inspect for dents, damaged or missing parts on hardware and proper operation of fresh and return air louver switch. Make repairs and replace missing parts.

WARNING

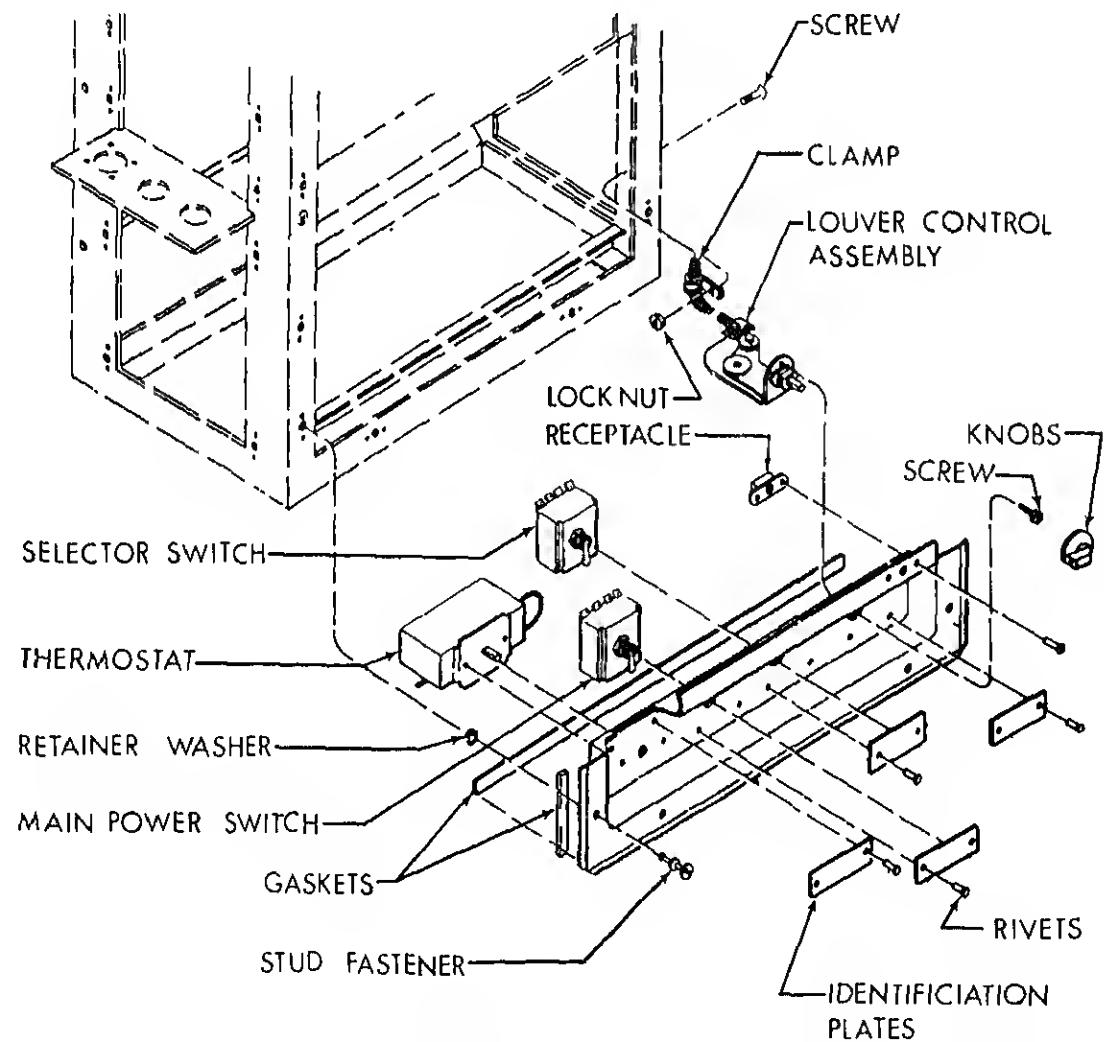
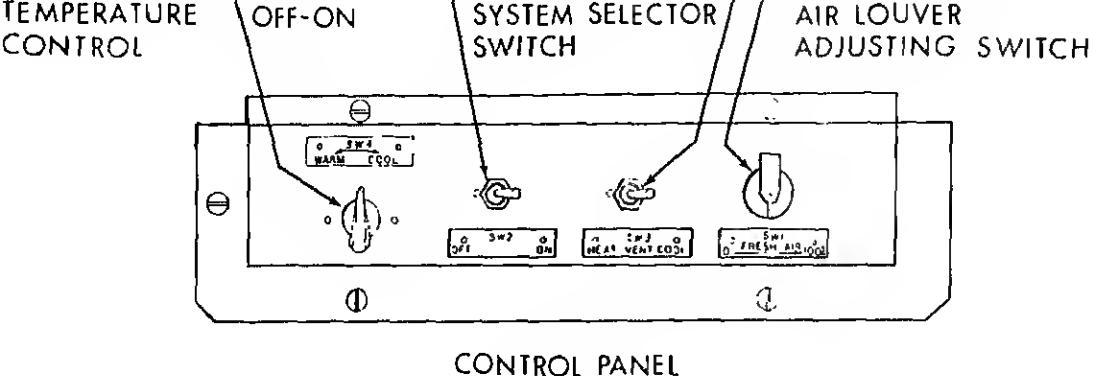
Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

Removal.

- (1) Disconnect power.
- (2) Remove the front panel. See figure 4-21.
- (3) Release the 1/4 turn stud fasteners and carefully pull the control panel out far enough to gain access to the parts on the back of the panel.
- (4) Remove/loosen setscrews on knobs and pull knobs off.
- (5) Remove screws from switches 1 and 4 and nuts and washers from switches 2 and 3. Carefully remove the control panel from the switches.

WARNING

WARNING



Replace missing mounting hardware and panel if damaged beyond repair. Inspect the identification plates riveted to the outside of the panel for legibility and obvious damage. Replace them if you cannot read all of the information shown on the plates. Inspect gasket material for hardening, permanent sets, tears or missing pieces. If necessary to replace gasket material, use the following procedure.

- 1) Remove as much old gasket material as possible by pulling or scraping it away from the metal surface.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

- 2) Soften and remove old adhesive and gasket residue, using acetone or methyl-ethyl ketone (MEK) and a stiff brush.
- 3) Coat the mating surfaces of the metal and the gasket with adhesive. Let both surfaces dry until the adhesive is tacky but will not stick to the fingers.
- 4) Starting with one end, carefully attach the gasket to the metal. Press into firm contact all over.

Painting. Should touch up or refinishing be necessary, see TM43-0139.

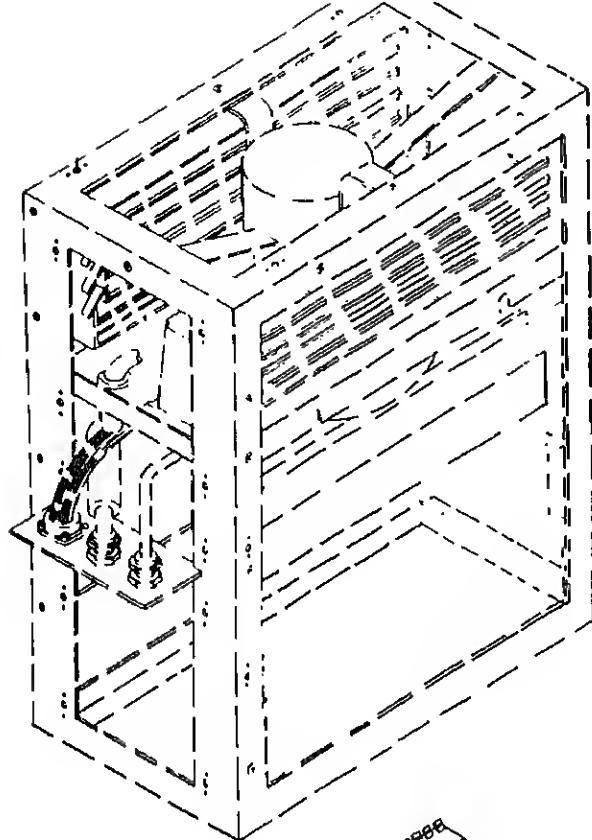
Reassembly/Installation.

- 1) If identification plates were removed, install new plates with rivets.
- 2) Position switches in proper holes and attach switches 1 and 4 with screws and switches 2 and 3 with nuts and washers. Tab and key type washers must be aligned with switch shaft end holes in control panel.
- 3) Place knobs on shafts of switches 1 and 4 and tighten set screws. Take care to match knob position with information shown on identification plates.
- 4) Carefully position the control panel in place and engage the 1/4 turn stud fasteners.
- 5) Reinstall the front panel.
- 6) Connect power.

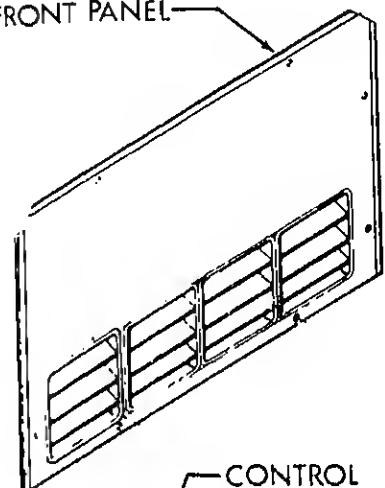
MAIN POWER OFF-ON SWITCH 2 (figura 4-25).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.



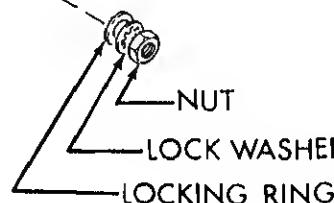
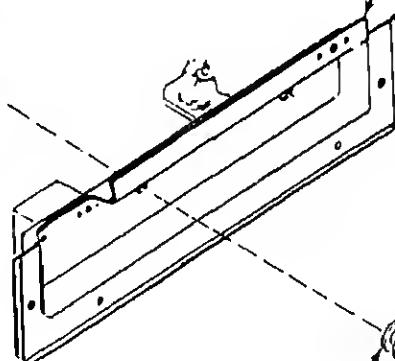
FRONT PANEL



CONTROL
PANEL



SWITCH 2
MAIN POWER
OFF-ON



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(3) Release the 1/4 turn stud fasteners and carefully pull the control panel out far enough to get to the parts on the back of the panel.

b. Testing.

- (1) Place switch in the ON position.
- (2) Touch the probes of a continuity tester to terminals 2 and 3, 5 and 6, 8 and 9 and 11 and 12. All of terminals should indicate continuity. If this test does not indicate continuity, the switch is bad and should be replaced.

c. Removal.

- (1) Tag and remove wire leads.
- (2) Remove nut, lock washer and locking ring.
- (3) Remove switch.

d. Installation.

- (1) Assemble switch to control panel using nut, lock washer and locking ring supplied with switch. Key type washers must be lined with switch shaft and holder in control panel.
- (2) Connect wire leads. See figure 4-7, wiring diagram.
- (3) Carefully position the control panel in place and engage the 1/4 turn stud fasteners.
- (4) Reinstall the front panel.
- (5) Connect power.

4-35. HEAT, VENT, COOL SYSTEM SELECTOR SWITCH 3

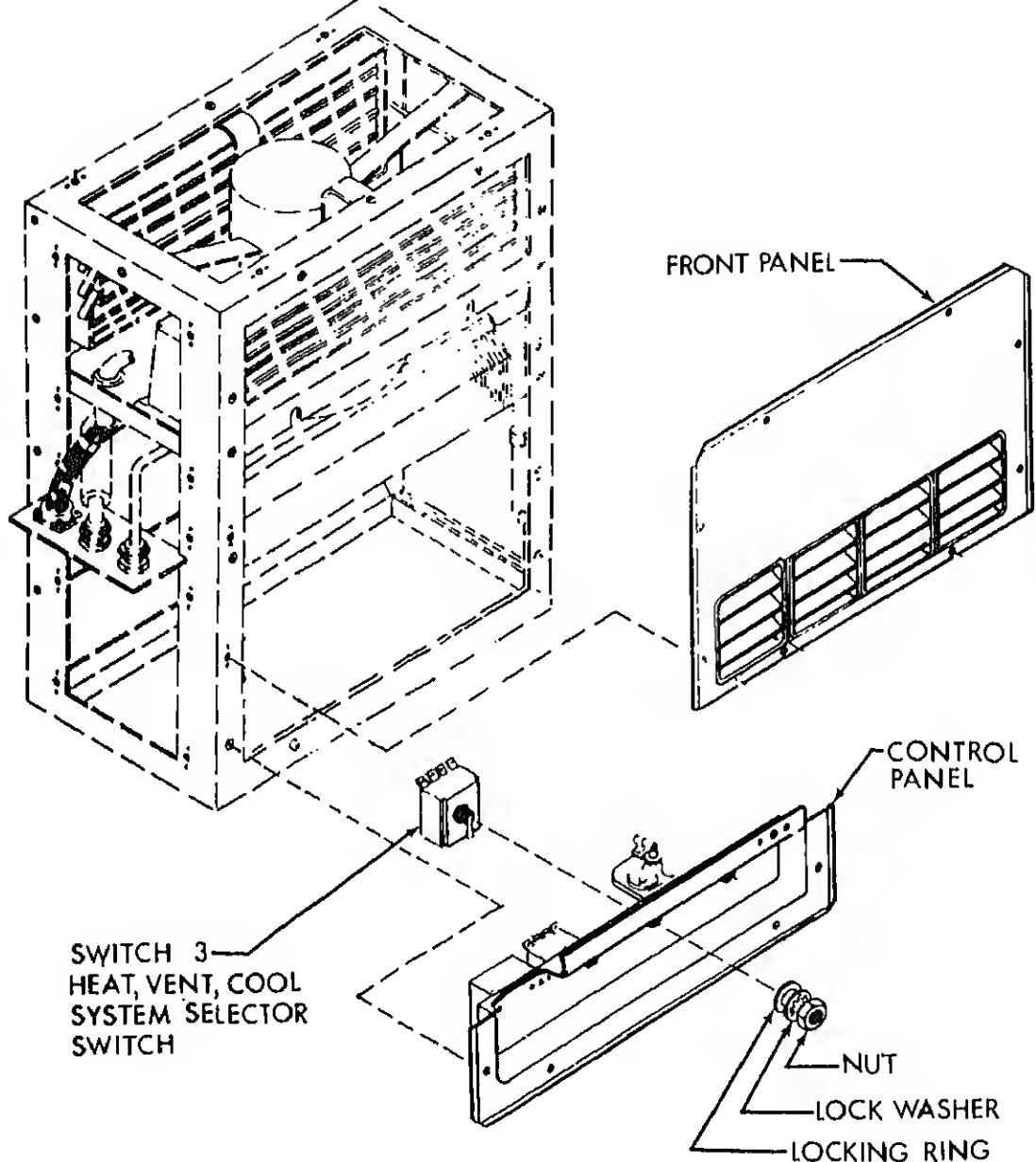
(figure 4-26).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

e. Access.

- (1) Disconnect power.
- (2) Remove the front panel.
- (3) Release the 1/4 turn stud fasteners and carefully pull the control panel out far enough to get to the parts on the back of the panel.



(3) Place switch in HEAT position.

(4) Touch the probes of a continuity tester to terminals 1 and 2, 4 and 5, 7 and 8 and 10 and 11 of terminals should indicate continuity. If they do not, the switch is defective and should be replaced.

c. Removal.

- (1) Tag and remove wire leads.
- (2) Remove nut, lock washer and locking ring.
- (3) Remove switch.

d. Installation.

- (1) Assemble switch to control panel using nut, lock washer and locking ring supplied with and key type washers must be aligned with shaft and holes in control panel.
- (2) Connect wire leads. See figure 4-7, wiring diagram.
- (3) Carefully position the control panel in place and engage the 1/4 turn stud fasteners.
- (4) Reinstall the front panel.
- (5) Connect power.

4-36. THERMOSTATIC TEMPERATURE CONTROL SWITCH

(figure 4-27).



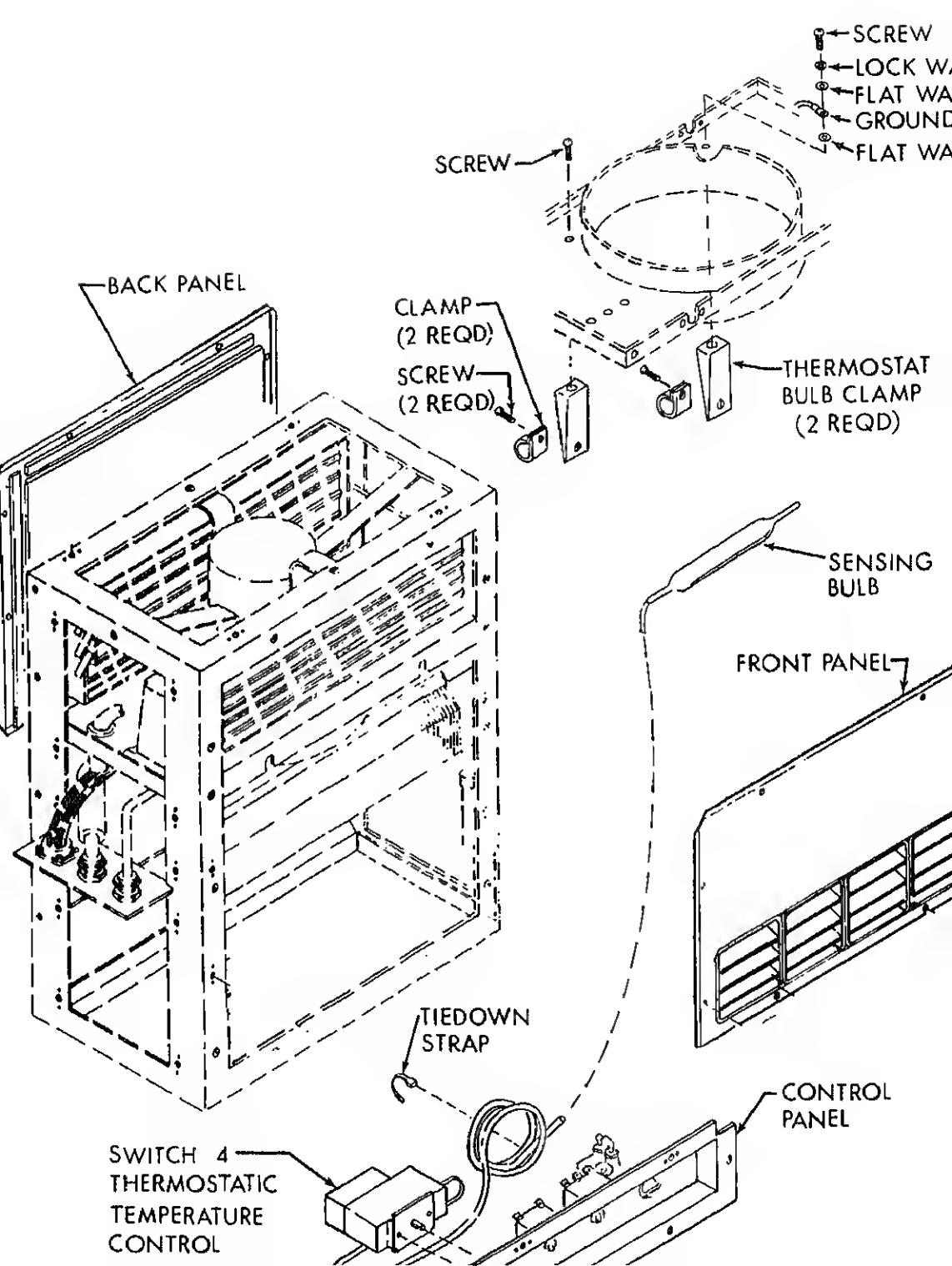
Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

a. Access.

- (1) Disconnect power.
- (2) Remove the front panel.
- (3) Release the 1/4 turn stud fasteners and carefully pull the control panel out far enough to gain access to the parts on the back of the panel.

b. Testing.

- (1) Place switch SW3 in COOL position.
- (2) Touch probes of continuity tester to terminals 1 and 2 of thermostet which should indicate continuity.
- (3) Rotate the thermostatic switch towards the warm position until a click is heard in the switch.



- (2) Loosen setscrews on knob end remove knob.
- (3) Remove screws and pull the switch from the control panel.
- (4) Remove the beck panel.
- (5) Loosen the screws holding the sensing bulb clemps and carefully remove the sensing bulb clemps.
- (6) Remove the tie down strop from the capillary line.
- (7) Remove the thermostatic temperature control switch from the unit.

d. Installation.

- (1) Carefully position the thermostetic switch in the unit.
- (2) Slip the sensing bulb in the clemps and tighten the clamp screws.
- (3) Carefully coil the capillary line and secure to the tubing close to the end of the sensing bulb with new tie down strop or electrical tape.
- (4) Install the two screws into the switch.
- (5) Place the knob on the switch shaft and tighten the setscrew. Take care to match the setscrew with information shown on the identification plate.
- (6) Connect wire leads. See figure 4-7, wiring diagram.
- (7) Carefully position the control panel in place and engage the 1/4 turn stud fasteners.
- (8) Reinstall the front end beck panels.
- (9) Connect power.

**4-37. FRESH AND RETURN AIR LOUVER SWITCH 1
AND FRESH AND RETURN DAMPER ASSEMBLY**

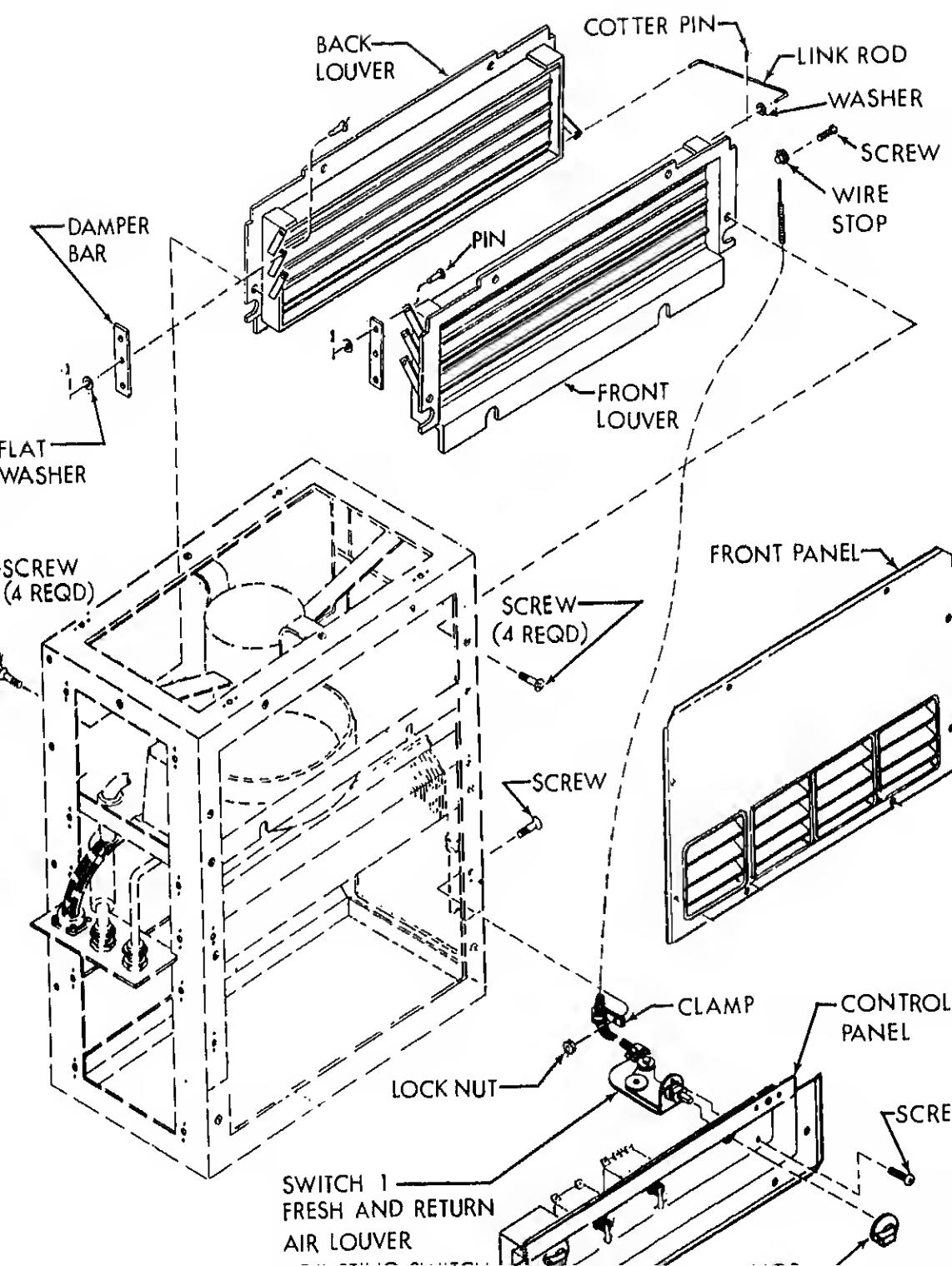
(figure 4-28).

WARNING

Disconnect power from the air conditioner before performing maintenance on internal components. The voltage used can be lethal.

a. Access.

- (1) Disconnect power.
- (2) Remove the following panels: top, right side, front, upper left end beck. See figures 4-



(1) Inspect for loose, damaged or missing parts or hardware. Replace missing or defective parts.

(2) Inspect louvers for dents, bent or broken blades, broken welds and proper operation when switch is adjusted. Repair minor damage. Replace if damage hinders operation of louvers.

c. Removal of adjusting switch.

- (1) Release the 1/4 turn stud fasteners and carefully pull the control panel out far enough to gain access to the parts on the back of the panel.
- (2) Loosen the setscrew and remove the knob.
- (3) Remove the screw and pull the switch from the control panel.
- (4) Remove the screw, clamp and nut holding the control wire housing in place.
- (5) Loosen the wire stop screw and remove the end of the wire from the wire stop.
- (6) Remove the front and return air louver adjusting switch from the unit.

d. Removal of the louvers.

- (1) Remove the two cotter pins and washers from the link rod and remove the link rods.
- (2) Remove the four screws from each of the louvers and remove the louvers.

e. Cleaning.

WARNING

Dry cleaning solvent (Fad Spec P-D-680) used to clean parts is potentially dangerous to personal and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

f. Lubricate the louvers by applying a drop of oil on any surface where friction might develop. This maintenance requires an occasional drop of oil on these surfaces.

g. Reassembly/Installation.

- (1) Install both the front and back louvers with four screws each.
- (2) Slip the ends of the link rod into holes in the damper arm and retain with two each of the washers and cotter pins.
- (3) Position the front and return air louver adjusting switch in the unit.
- (4) Connect the end of the control wire to the front damper using a screw and wire strap.

- (9) Loosen the screw in the wire stop end and the set screw in knob and adjust louvers so that the indication on the switch plate matches the knob pointer. Tighten the screw and set screw.
- (10) Install the following panels: top, right side, front, upper left and back.
- (11) Connect power.

-38. EVAPORATOR FAN (figure 4-29).

a. Removal.

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Remove the following panels: top, right side and upper left. See figures 4-21 and 4-22.
- (3) Remove the two screws that attach the two larger motor supports to the sides of the evaporator frame.
- (4) Remove the four screws and the four lock washers that attach the two larger supports to the frame.
- (5) Remove the two screws securing the smaller motor supports to the frame, taking care to support the motor and fan assembly.
- (6) Carefully lift the motor and fan assembly out far enough to gain access to the set screw(s). In the event of difficulty, use a flat-bladed screwdriver to dislodge the set screw(s).
- (7) Loosen the set screw(s) and remove the fan.

WARNING

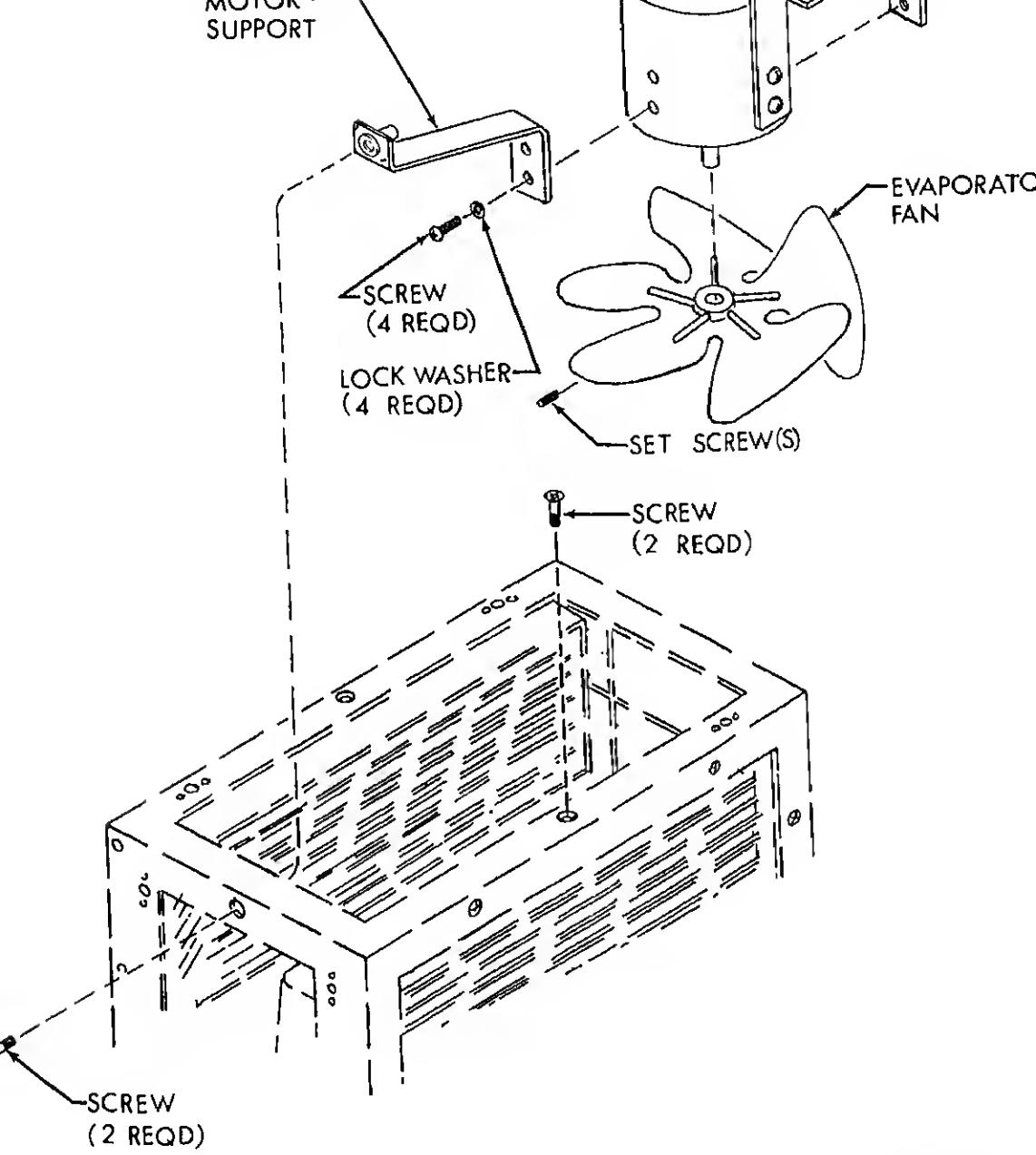
Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Cleaning. Wipe the fan blades with a clean cloth dampened slightly with dry cleaning solvent (Fed Spec P-D-680) and dry thoroughly.

Inspection. Check the fan for breaks, cracks, dents, loose rivets and bent or otherwise deformed blades. Replace the evaporator fan if it is defective.

Installation.

- (1) Slip the fan onto the motor shaft with the hub facing away from the motor. Align the screw(s) with the flat surfaces on the motor shaft. Tighten the set screw(s).



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Figure 4-29. Evaporator Fan.

fan shroud should be even. If necessary, loosen the screws that attach the motor supports to the frame and adjust the clearance.

-) Install the top, right side and upper left panels.
-) Connect power to unit.

EVAPORATOR FAN MOTOR

(figura 4-30).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

removal.

-) Disconnect power.
-) Remove the following panels: top, right side and upper left. See figures 4-21 and 4-22.

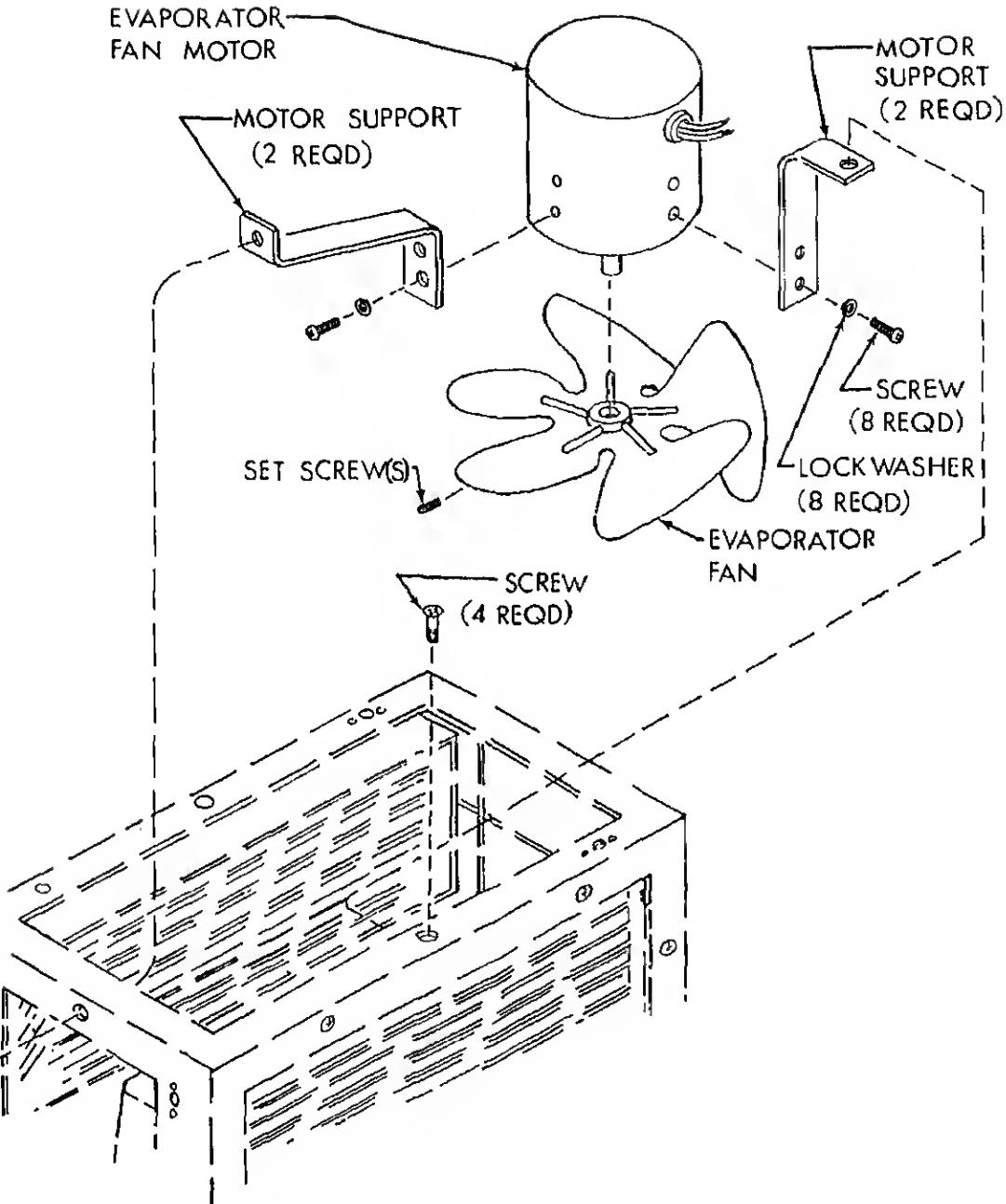
WARNING

Discharge capacitor before touching the two terminals.

-) Tag and disconnect motor leads from the capacitor and the relay.
-) Remove the two larger motor supports by removing two screws from each side of the frame and washers and lock washers from each end of the motor.
-) Remove the two remaining screws attaching the smaller motor supports to the frame, taking care to support the motor and fan assembly.
-) Carefully lift the motor and fan assembly out of the unit.
-) Remove the two smaller motor supports from the motor by removing four screws and four washers.
-) Loosen the set screw(s) and remove the fan.

WARNING

Dry cleaning solvent (Fad Spac P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).



SCREW
(4 REQD)

TS 4120-362-13/4-3

wires end free rotation of motor shaft. If a defect is found that could cause the unit to malfunction replace the motor.

- 2) Check the fan for breaks, cracks, dents, loose rivets and bent or otherwise deformed fan blades. Replace the fan if it is defective.
- 3) Check the mounting brackets for breaks, cracks, dents and condition of threads in blind nuts. Repair minor damage using conventional sheet metal repair methods. Replace damaged blind nuts or the bracket if damage indicates replacement.

Testing.

- 1) Using a continuity tester, check for continuity between motor leads. If a lack of continuity is shown an open winding is indicated. Replace the motor.
- 2) Check for continuity between the red lead and the motor frame. If there is continuity, one of the windings is shorted to ground. Replace the motor.

Installation.

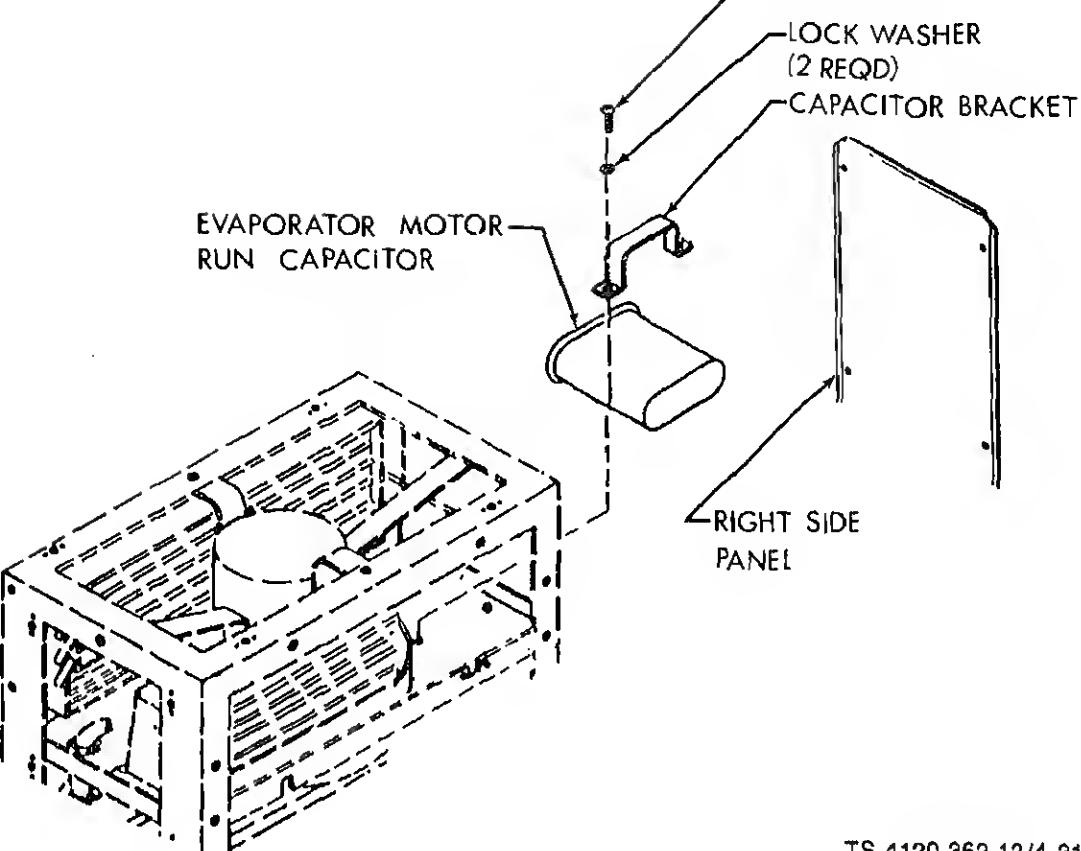
- 1) Install the two smaller motor supports using four each of the screws and lock washers. Take care to strip the threads in the aluminum motor housing. Slip the fan onto the motor shaft with the hub facing away from the motor. Align the set screw(s) with the flat surfaces on the motor shaft. Tighten set screw(s).
- 2) Carefully position the fan and motor assembly in the unit and install the two screws in the small motor supports.
- 3) Install the two larger motor supports by attaching two screws to the frame and four each of the screws and lock washers to the motor. Take care not to strip the threads in the aluminum motor housing.
- 4) Check the fan for clearance by spinning the fan by hand. Clearance between the blade tips and fan shroud should be even. If necessary, loosen the screws that attach the motor supports to the frame and adjust the clearance.
- 5) Connect the motor leads to the relay and capacitor. See tags on removed motor and also see wiring diagram, figure 4-7.
- 6) Install the top, right side and upper left panels.
- 7) Connect power to unit.

EVAPORATOR FAN MOTOR RUN CAPACITOR

(figure 4-31).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.



TS 4120-362-13/4-31

Figure 4-31. Evaporator Fan Motor Run Capacitor.

removal.

Disconnect power.

Remove the right side panel.

WARNING

Discharge capacitor before touching the two terminals.

Tag and disconnect the leads.

Remove two each screws and lock washers and remove the capacitor bracket.

Remove the capacitor.

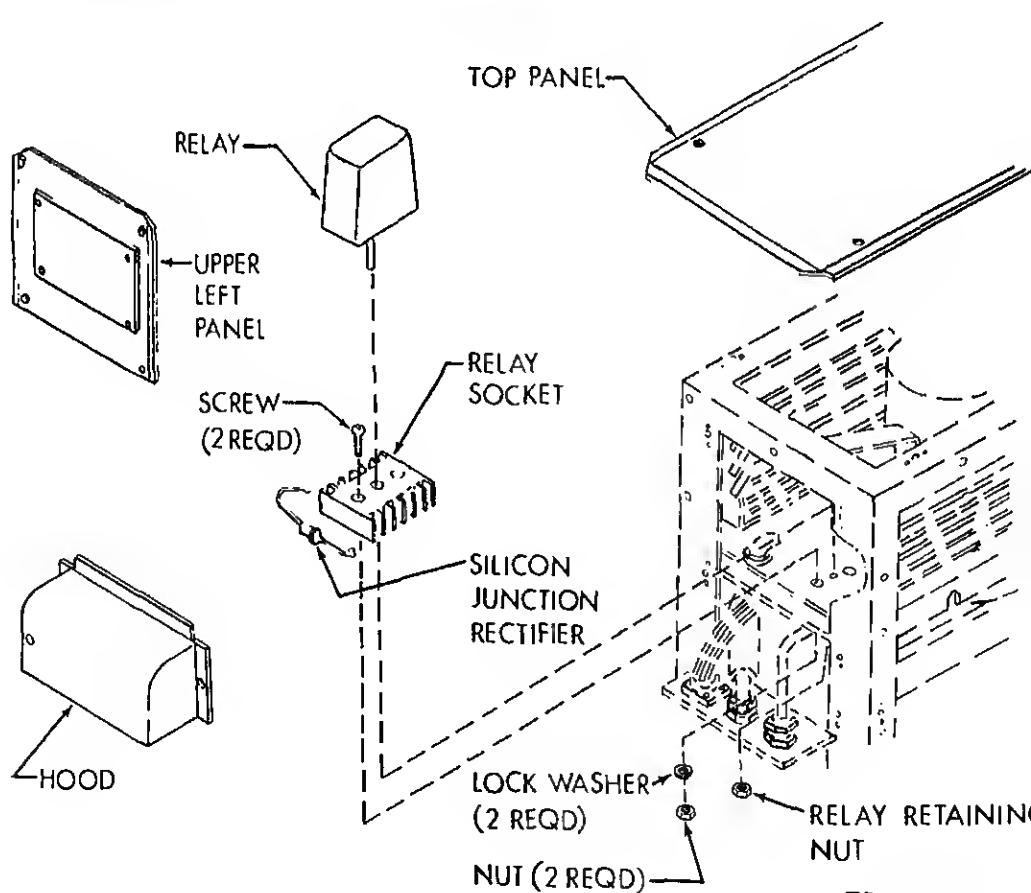
- (1) Connect the leads.
- (2) Connect the leads. See figure 4-7, wiring diagram.
- (3) Install the right side panel.
- (4) Connect power to the unit.

4-41. POWER RELAY (EVAPORATOR SECTION)

The power relay is capable of switching 10 amperes per min. at 115 V ac. It is mounted on the evaporator guard. See figure 4-32.

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.



Removal. Remove the relay retaining nut and pull the relay up and out of the unit.

Inspection. Inspect for cracks, corrosion, loose electrical connections and loose mounting hardware. Repair and tighten loose electrical connections and tighten loose mounting hardware. Replace cracked or badly corroded parts.

Testing. Touch the probes of a continuity tester to pins 6 and 7. If a lack of continuity is indicated, replace the relay.

Installation.

- (1) Carefully align the relay pins with the relay socket. Press the relay firmly into the socket and secure with relay retaining nut.
- (2) Install the hood and the top and upper left panels.
- (3) Connect power to the unit.

2. SILICON JUNCTION RECTIFIER (EVAPORATOR SECTION)

CR2 silicon junction rectifier, is wired to pins 6 and 7 of the power relay socket terminals. This rectifier blocks radio frequency interference (RFI) spikes from entering the power circuit. See figures 4-32 and 4-33, figure 4-7.

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

Access. Disconnect power and remove the upper left panel.

Testing.

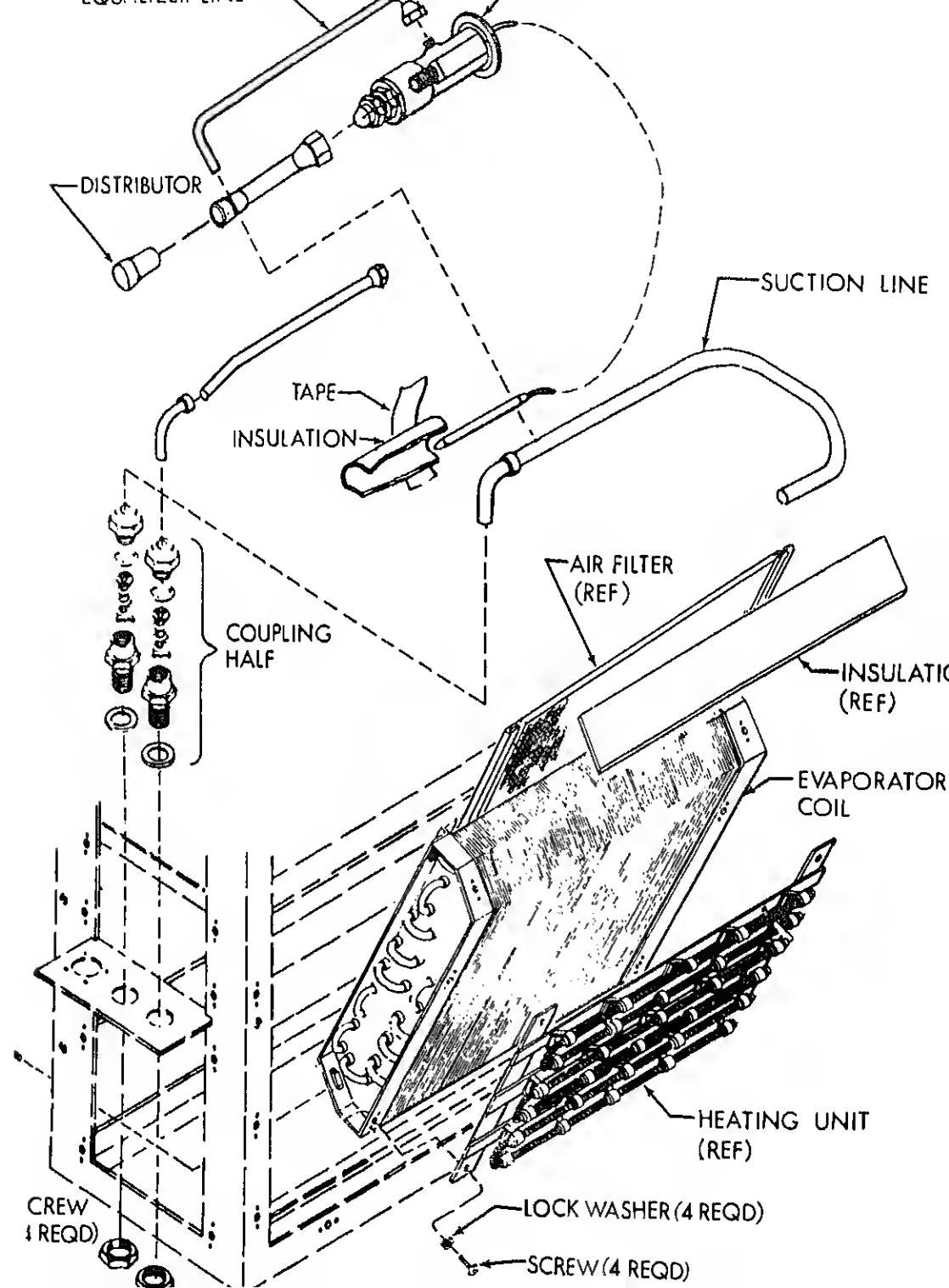
- (1) Disconnect one lead of the rectifier from either terminal 6 or terminal 7 of the power relay socket terminals.
- (2) Using an ohmmeter, place a probe on each of the rectifier leads and take a reading. There should be a high reading in one direction and a low reading in the other direction. Replace if defective.

Installation.

- (1) When a silicone junction rectifier must be replaced install heat shrink tubing and terminate rectifier leads.
- (2) Connect the rectifier to terminals 6 and 7 of the relay socket. See wiring diagram figure 4-7 for pin input-output connections.
- (3) Install the upper left panel and connect power to unit.

43. REFRIGERANT PIPING (EVAPORATOR SECTION)

(figure 4-33).



CAUTION

The electronic leak detector is sensitive to the presence of refrigerant gas in atmosphere. When refrigerant gas is present in the atmosphere of the work area, false indications can result. Use in a well ventilated but draft free area.

- (1) Electronic Leek Detector. Turn the electronic unit on, and slowly pass the probe around all points of the refrigerant system at which a leak could exist. Depending upon the type of detector used, a leak will be indicated by an audible signal, a light, or by meter deflections.
- (2) Soap Solution. Brush soap solution on all possible points of leakage, and watch for bubbles. Follow a definite sequence to avoid missing any points that should be tested. Wipe the solution from joints, and mark any point at which a leak is found.

Replacement. If test results show any leaks, mark the location and report to direct support maintenance.

44. EXPANSION VALVE (EVAPORATOR SECTION)

(figure 4-33).

Expansion valve is located in the lower right area of the evaporator section. It controls refrigerant flow to the evaporator coil.

- . Access. Remove the right side and back panels. See figures 4-21 and 4-22.
- . Inspection/Test of Installed Items.
 - (1) Inspect for evidence of leaks, kinked or otherwise damaged capillary line, and loose or missing valve stem cap.
 - (2) Check thermal bulb to see that it is securely clamped to the suction line.
 - (3) If a leak is suspected or indicated, test per paragraph 4-43c.
- . Replacement. If inspection/test results indicate replacement, refer to direct support maintenance.
- . Replacement. If inspection/test results indicate replacement, refer to direct support maintenance.
- . Install the right side and back panels.

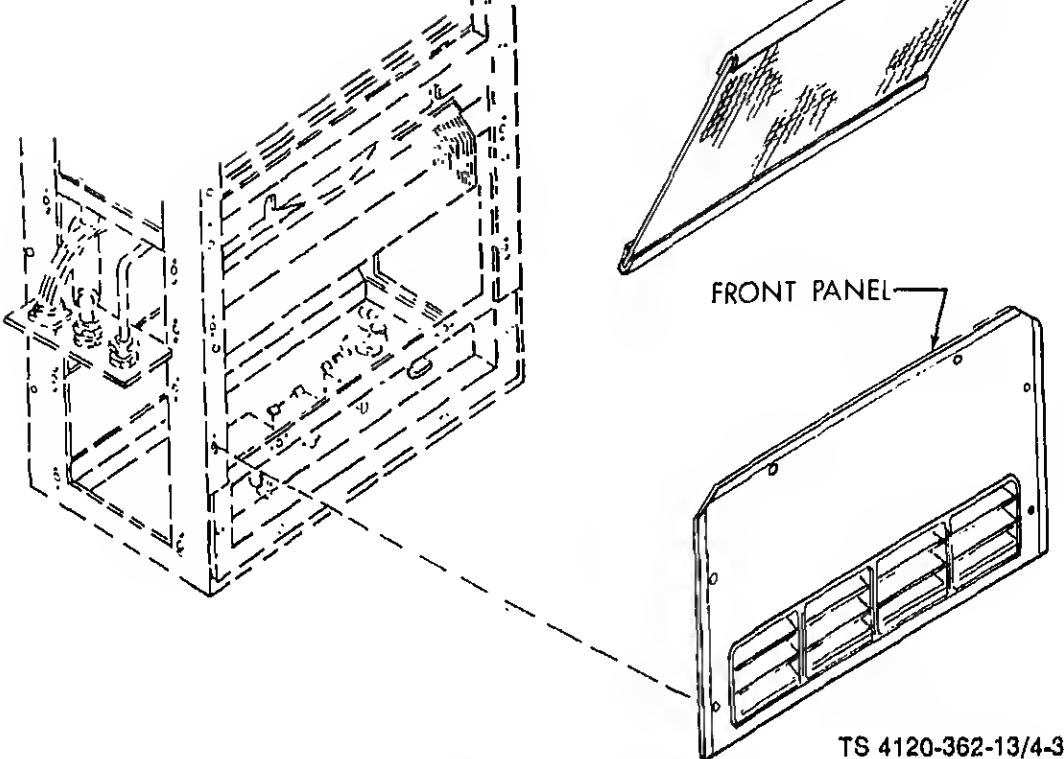
45. AIR FILTER (EVAPORATOR SECTION)

Air filter, located in the evaporator section, traps dust, dirt and other airborne debris. See figure 4-34.

. Removal.

- (1) Remove the front panel.

- (2) Slide the air filter up and out of the side clips located on the top side of the evaporator coil.



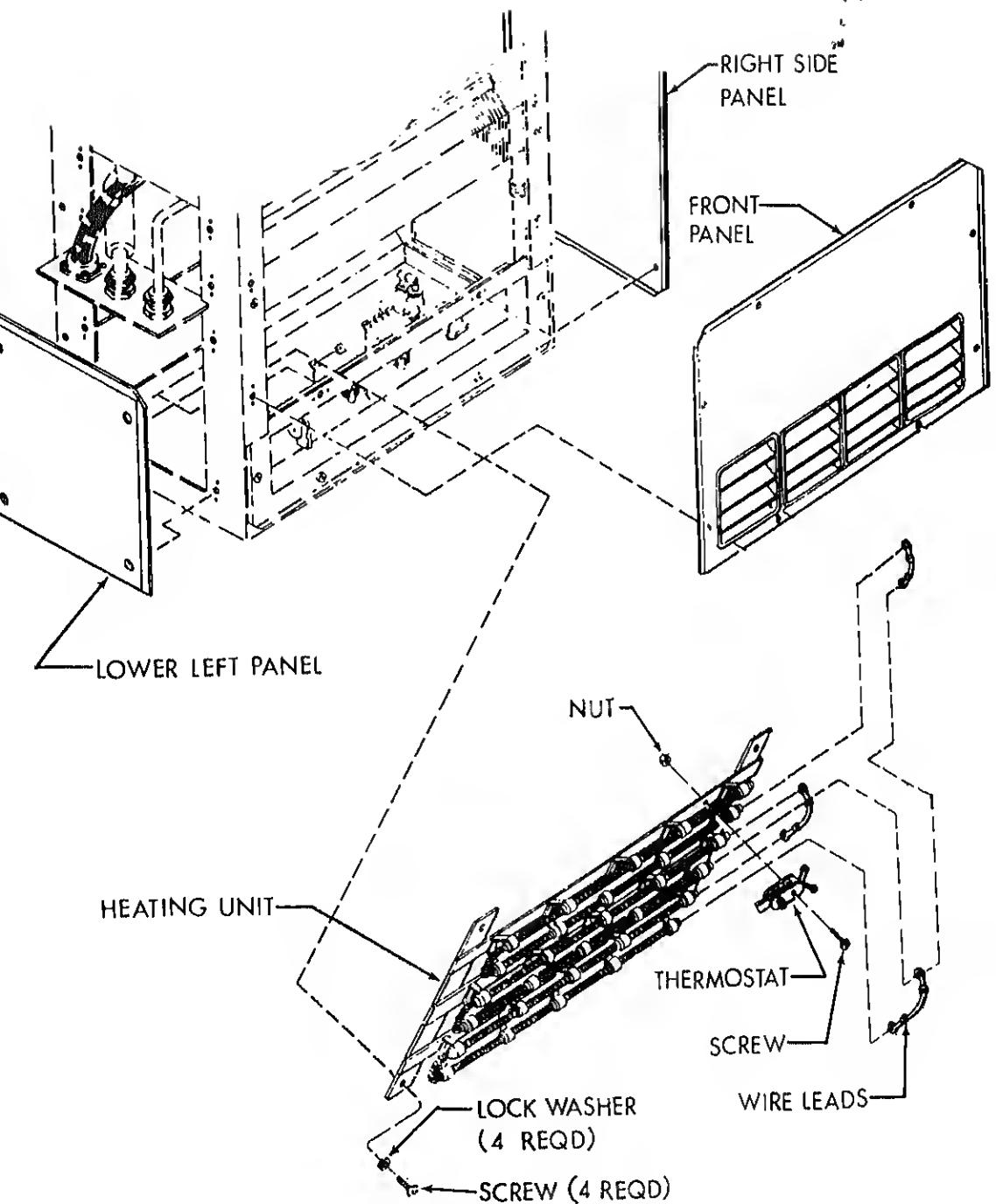
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Figure 4-34. Air Filter, Evaporator Section.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38° to 59°C).

- b. Cleaning. Immerse the filter in detergent solution or dry cleaning solvent (Fed Spec P-D-680). Agitate till dirt is removed, using a soft brush if necessary to loosen caked-on dirt. Rinse in clear water or dry cleaning solvent. Allow filter to dry completely.
- c. Inspection. Inspect the filter for damage such as perforations or punctures in the screen and aluminum foil maze that could permit passage of unfiltered air. Inspect for areas of packed or crushed material that would obstruct airflow through the filter. Check for deformation of the frame, and straighten if possible without crushing maze material. Replace filter if crushed, punctured, badly deformed or broken.
- d. Carefully slide the air filter down into the side clips located on the top edge of the evaporator coil.
- e. Install the front panel.



Access.

- (1) Disconnect power.
- (2) Remove the following outside panels: front, right side, and lower left side.

Inspection/Test of Installed Items.

- (1) Inspect the heater coils for broken elements, cracked or broken insulators, excessive corrosion, loose or broken mounting strips. If any of these conditions exist replace the heating unit.
- (2) Inspect the heater overtemperature protector thermostat for pitted contacts, excessive corrosion, cracked or broken body parts. If any of these conditions exist, replace the thermostat.
- (3) Check the heater and the thermostat for loose or missing hardware. Replace or tighten hardware indicated.
- (4) Use a continuity tester and check heater coil continuity by touching the probes to each end of the heater coil. If continuity is not indicated, it is defective and must be replaced.

WARNING

The power supply must be connected for the following tests. Take the necessary safety precautions.

c. Testing of Installed Items.

- (1) Connect the power supply.
- (2) Place switch SW2 in the ON position. Place switch SW3 in the HEAT position.
- (3) With a voltmeter, check the voltage to the heater coil terminals and the heater overtemperature protector thermostat for 115 volts, nominal. If the nominal 115 volts is not recorded, check for problems with the power supply, switches or wiring to the heater. See wiring diagram, figure 4-7.
- (4) If 115 volt power is recorded at the thermostat but not at the heater, replace the thermostat.

d. Removal.

- (1) Disconnect power.
- (2) If heaters have been operated, let the unit cool down.
- (3) Tag and disconnect electrical leads to heater and thermostat.
- (4) Remove four screws and four lock washers and carefully remove the heater and thermostat assembly from the unit.
- (5) Remove the screw and nut from the thermostat and remove the thermostat.

Cleaning.

Using a clean, dry cloth or a soft brush, carefully clean heater and thermostat.

Repair or replacement. Repairs, other than minor repairs of the mounting frame of the heater, are not advised. Should any of the test or inspection results so indicate, the heater or the thermostat should be replaced.

Installation.

- (1) Install the thermostat using a screw and nut.
- (2) Carefully mount the heater assembly to the evaporator coil flanges using four screws and four washers.
- (3) Connect the electrical leads. Refer to the tags added when wires were removed and the wiring diagram (figure 4-7).
- (4) Install the front, right side and lower left side panels.
- (5) Connect power to the unit.

7. EVAPORATOR COIL

The evaporator coil consists of copper tubing with aluminum fins. It removes heat from the air and transfers refrigerant. See figure 4-33.

Access. See figures 4-21 and 4-22 and remove the following panels: front, right side, lower left side and back.

Inspection/Test of Installed Items.

- (1) Check for accumulated dirt. Clean if an accumulation of dirt is evident.
- (2) Check fins for dents, bent edges or any condition that would block or distort air flow. Straighten damaged fins with a plastic fin comb.
- (3) If a leak is indicated, test per paragraph 4-19c.

WARNING

Compressed air used for cleaning purpose will not exceed 30 PSI.

Cleaning. Clean coil with a soft bristled brush, or use compressed air at 30 psi or less from the inside of the coil to blow the dirt out. Take care to avoid fin damage.

Repair/Replacement. If inspection/test results indicate repairs or replacement, refer to direct support maintenance.

Install the following panels: front, right side, lower left side and back.

) Check for missing, loose or damaged hardware. Replace all hardware found missing or defective.

) Inspect for dents, bends and cracked or broken welds. Refer defective condition to direct support maintenance.

Repair. Refer all repairs other than hardware replacement to direct support maintenance.

Install all panels and the hood. See figures 4-21 and 4-22.

Section VI.

PREPARATION FOR STORAGE OR SHIPMENT.

See TM740-90-1 for Administrative Storage of Equipment.



Maintain the units in a vertical position at all times.

Intermediate. No special handling is required for Intermediate storage other than protection from damage and the elements.

Long term storage or preparation for shipment by air. When the unit is to be moved a considerable distance, it is advisable to pump down the refrigerant charge into the receiver. Proceed as follows:

- 1) Remove cap from refrigerant valve stem located on receiver immediately behind condenser air take grille.
- 2) Turn valve stem clockwise as far as it will go.
- 3) Turn SW4 to coldest setting and set SW3 to COOL.
- 4) Turn SW2 to ON and observe sight glass. Bubbles will soon appear. Continue operating compressor until bubbling diminishes and almost disappears. A slight amount of colorless liquid refrigerant will be noticed as well as a little oil. Just before bubbling and liquid refrigerant disappears entirely, turn SW2 to OFF to shut off unit.
- 5) Disconnect the power supply cable.
- 6) Remove the interconnecting cable and refrigerant hoses.
- 7) Remove the floor or wall mounting hardware and drain connections.
- 8) Crate the unit, utilizing base mounting bolts, to secure sections to base of crate or skid.
- 9) Pack hoses and cables in crates with unit to avoid loss.
- 10) Fill voids in crate with shock absorbing material. Do not use material that may clog condenser evaporator coils.
- 11) Include warning tag with shipment indicating necessity for opening receiver valve prior to operation of the unit.

All Information	I	Compressor (Condenser Section)
Tools and Lists	5-1	Sight Glass (Condenser Section)
Maintenance Instructions	II	Filter-Drier (Dehydrator) (Condenser
Refrigerant Hoses	5-2	Section)
Refrigeration Component and System		Receiver (Condenser Section)
Repair General	5-3	Condenser Coll
Pressure Switch (Condenser Section)	5-4	Expansion Valve (Evaporator Section)
Refrigerant Piping (Both Sections)	5-5	Evaporator Coll
Vacuum Valve (Condenser Section)	5-6	Frame (Both Sections)
Couplings (Both Sections)	5-7	

Section I.

GENERAL INFORMATION.

TOOLS AND LISTS

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

No special tools are required for maintenance of the equipment. Test, maintenance and diagnostic equipment (TMDE) and support equipment include standard pressure and vacuum gauges, vacuum pump and charging manifolds found as standard equipment in any refrigeration shop.

Repair parts are listed and illustrated in the Repair Parts and Special Tools (RPSTL) list 5-4120-362-23P covering organizational and direct support maintenance for this equipment.

Section II.

MAINTENANCE PROCEDURES.

REFRIGERANT HOSES

Action/test results shown in paragraph 4-9a indicate replacement of the refrigerant hoses, replace them as indicated per the following instructions.

Remove. See figure 4-6.

- 1) It is normally not necessary to discharge the refrigerant to replace the hoses. Both the fittings on the unit end the fittings on the hose ends are equipped with poppet valves that close when the hoses are disconnected.
- 2) Remove the hood end upper panel above the hood from both sections.

(3) Use two wrenches, one to hold the hex portion of the half coupling body located directly below the mounting angle on the unit, the other to loosen the hose assembly end from the unit. If the hose is to be reused, do not allow it to kink or twist.

b. Installation.

(1) Use two wrenches, one to hold the hex portion of the half coupling body located directly below the mounting flange on the unit, the other to tighten the hose assembly end to approximately 47.8 pounds (47.8 newton meters) of torque.

CAUTION

Do not allow the fitting on the unit to turn. Avoid kinking or twisting the hose.

(2) Install the hoods and upper panels on both sections.

5-3. REFRIGERATION COMPONENT AND SYSTEM REPAIR GENERAL

The following instructions will apply to most all refrigeration item repair and replacement procedures. Individual component listings for step-by-step removal and replacement instructions.

a. Releasing the refrigerant charge.

WARNING

DANGEROUS CHEMICAL

Is used in this equipment

DEATH

or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin or eye contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

- (1) Remove the Inteka air grille from the condenser section. See figure 4-8.
- (2) Remove valve cap from receiver valve stem.
- (3) Back seat the receiver valve by turning the valve stem counterclockwise until it stops.
- (4) Remove flare cap from the receiver valve.

Do not permit the oil to escape from the unit. If oil is escaping, close the valve slightly.

Do not permit the refrigerant to escape fast enough to form ice or frost on either the lines or the valve.

Leak Test of an uncharged system.

-) Remove the valve cap from the receiver valve stem.
-) Turn valve stem counterclockwise until it stops.
-) Remove flare cap from the receiver valve.
-) Connect refrigerant R-12 source to gage valve port. Turn valve clockwise one turn. Allow refrigerant to build up pressure to 50 psig. (3.62 kgm/cm²).
-) Turn valve stem counterclockwise until it stops. Disconnect refrigerant line and connect line from regulated dry nitrogen source to the removable frame angle.
-) Remove the two screws and lock washers holding the valve to the bracket.

Installation (figure 4-16).

-) Assemble the service valve to the bracket with two each screws and lock washers.
-) Install the valve and bracket assembly to the removable frame angle with two each screws and nuts.
-) Connect and tighten the flare nuts connecting the tubing to the service valve.
-) Leak test the valve and newly connected tubing in the area of the valve in accordance with paragraph 5-3b.
-) Evacuate the system in accordance with paragraph 5-3c.
-) Charge the system in accordance with paragraph 5-3d.
-) Install the rear panel.
-) Connect power to the unit.

Turn valve stem one turn clockwise and allow nitrogen to build up to 300 psig. Turn valve stem counterclockwise until it stops.

-) Test for leaks using one or both of the following methods:

CAUTION

The electronic leak detector is sensitive to the presence of refrigerant gas in the atmosphere. When the refrigerant gas is present in the atmosphere of the work area, false indications can result. Use in a well-ventilated but draft-free area.

from eti joints, end mark eny joint at which e leak is found.

(10) Retraese the test cherge.

Evecueting tha system.

- (1) If the Inteke grille on the condenser section Is In place, ramova lt. (figure 4-8).
- (2) Ramova racalvar valva stem cap.
- (3) Ramova gege port cap from racalvar valve.
- (4) Connact rafrigerent compound gege to the gaga port of velve with charging hose.
- (5) Connect the second hosa of rafrigerent gege manifold to suction sida of vecuum pump.
- (6) Open charging velve on recalver; than stert vecuum pump. Open velve on gage menifold.
- (7) Evecuet system for 30 minutes. Gaga indication should be et laest 28 inches of mercury.
- (8) Closa velva on compound gege menifold. Stop vacuum pump end remove hosa.
- (9) Connact hose for R-12 drum and open drum valve. Loosan hosa fitting on gega manifold end R-12 vapor to swaap thru hosa.
- (10) Tighten hose fitting on manifold, open manifold valva. Open receiver velve end admitt R-12 vap system until gage reads 15 pounds ($1.1 \text{ kgm}/\text{cm}^2$) positive prassura.
- (11) Closa drum valve and manifold valve end raconnact hose to vecuum pump. Start pump, manifold valve end avacuate for 30 minutes. Repeat steps 6 thru 10 threa times. On final evac run vacuum pump for ona hour.

NOTE

Check bullsaye In sight glass after final avevacuation. Color should be pure graan. If thara is a tint of yellow, repeat steps 6 thru 10 until color is pure graan.

NOTE

Allow unit to ramain on vacuum for 15 minutee. If vacuum holds, system Is ready for cherging. If vecuum does not hold, chack for laaks In system.

Cherging the system.

- (1) Evacuate the system. Refer to peregraph 5-30c.
- (2) Blaad tha charging equipment as follows:
 - (a) Connact mated rafrigerant charging bottla to drum of R-12.
 - (b) Connact outlet of cherging bottla to gaga manifold by meens of the charging hosa.

- (e) Tighten fitting on inlet to metered bottle and open inlet valve slightly.
- (f) Open vent valve on charging bottle end allow R-12 vapor to sweep through bottle.
- (g) Close vent, close inlet valve. Open outlet valve end loosen hose fitting on gage manifold.
- (h) Open inlet valve to metered bottle and allow R-12 vapor to sweep through inlet hose bottle and outlet hose to gage manifold.
- (i) Tighten hose connections to manifold valve, shut outlet valve from metered bottle.
- (j) Invert R-12 drum end feed 2.5 lbs. of liquid refrigerant into metered bottle (opening the vent valve very slightly will facilitate this process).
- (k) Close inlet valve to metered bottle and valve vent.

NOTE

Make sure that the bottle contains 2.5 lbs. of refrigerant. If necessary, place slightly more than 5 lbs. in bottle end bleed off excess through vent.

- (l) When charging direct from a drum of refrigerant, first weigh the drum and observe the weight during the charging operation taking care to stop when 2.5 lbs. of refrigerant has been used.

Charge the system as follows:

- (a) Remove cap, turn suction valve stem clockwise until it stops and connect hose from manifold suction gage.
- (b) Connect hose from manifold discharge gage end purge air from both the suction and discharge gage hoses. Open metered bottle outlet valve, manifold valve to the discharge gage end receiver valve to allow refrigerant to enter system 1.5 lbs will enter readily.
- (c) To charge remainder of refrigerant into system, front seat (clockwise) receiver valve and close discharge gage manifold valve. Operate compressor until discharge gage indicates 5 psig. Open gage manifold valve. Remainder of refrigerant should flow into system. If not, shut off manifold valve and operate compressor until gage indicates 5 psig. Stop compressor and open manifold valve. Repeat as often as necessary to charge entire 2.5 lbs into system.

CAUTION

Do not charge liquid refrigerant into the suction service valve. Damage to the unit will result.

Be sure the receiver valve. Close all valves in charging system and remove hose fitting from receiver valve. Replace stem cap and gage port cap.

Brazing/Debrazing techniques.

The refrigeration system must be completely discharged before removing any part of the system. If

from the joint, sometimes melting an adjacent joint at the same time.

- Cleaning. Residual filler metal can be removed from a debrazed tube in the following manner.

WARNING

Wear welders' gloves or other thermal protective gloves when performing the following operation.

- (a) Fold a piece of fiberglass cloth about 6 x 6 inches and wrap it loosely around the tubing, ~~end~~ inches away from the tubing end to be cleaned.
- (b) Heat the tubing at the end to be cleaned until the braze filler metal is thoroughly melted.
- (c) Grasp the fiberglass wrapping firmly, and pull it over the tubing end with a twisting motion.

) Protection from heat.

WARNING

Polyurethane foam insulation breaks down to form toxic gases when heated to brazing temperature.

- (a) When brazing/debrazing refrigerant tubing or fittings near an insulated wall of the air conditioner, use a nonheat conductive shield to deflect the flame of the torch away from the insulation. Perform the operation in a well ventilated area.
- (b) When brazing/debrazing tubing from expansion valves, solenoid valves or other components that could be warped or damaged by brazing temperature, the component should be completely assembled to the extent possible, and the body alone brazed/debrazed. If disassembly is impractical or impossible, the entire component, except for the joints to be heated, should be wrapped in wet cloth to act as a heat sink.

) Types of filler alloy (solder).

- (a) Phos-copper. The entire joint area must be as clean as possible. If tubing must be cut to make repair, the cut end must be reamed both inside and out.

CAUTION

Use extreme care to prevent contamination of refrigerant system with dirt, moisture, metal chips, flux or other foreign particles.

Parts to be joined should be close fitted, approximately 0.003 inch clearance. Copper to copper joints will require no flux, but all other metals will require the use of an approved flux. The

cause the flux to flow evenly into the joint. Avoid overheating and remelting. To remove surplus flux, wipe with a cloth saturated with hot water.

When making joints in areas close to the sight glass, valves or hose fittings, a heat sink must be provided to prevent the transfer of heat into areas which may be damaged by extremely high temperatures.

If care is used to prevent moisture from entering the system, such a heat sink may be made from a cloth soaked in water and wrapped around the temperature sensitive part.

(b) Silver Brazing Alloys. Although the phosph-copper joints are acceptable in most instances, a more dependable joint can be made with silver brazing alloy with a high silver content. It is especially recommended to joint dissimilar metals and for use in joints subject to vibration. Clean all joints thoroughly of all oxides, dirt and grease. Maintain 0.009 inch maximum clearance between tube and fitting. Cover the joint surfaces with an approved flux before brazing.

CAUTION

Be careful not to allow the flux to contaminate the system.

Heat the joint uniformly with neutral flame and broad heat until the flux is liquid. Apply the rod to the joint and keep flame moving. Excess flux may be removed by wiping with a cloth saturated in hot water.

PRESSURE SWITCH (CONDENSER SECTION)

See paragraph 4-17 for operational check, inspection and cleaning instructions.

Replacement. (figure 4-14).

WARNING

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

- 1 Disconnect power.
- 2 Remove the top, upper right and rear panels.
- 3 Release the refrigerant in accordance with instructions in paragraph 5-3a.
- 4 Debraze the end of the capillary line from the tank in accordance with instructions in paragraph 5-3e.
- 5 Tag end disconnect wires leads.
- 6 Remove the two screws holding the bracket to the frame and remove the pressure switch and bracket from the unit.
- 7 Remove the two screws and lock washers holding the bracket to the switch.

- (3) Carefully form the capillary tubing so that the spot from which the old capillary was removed. Coil the slack capillary tubing into a 3 inch (7.62 cm) diameter or larger coil and tape to a nearby tube or other rigid support.
- (4) Braze the end of the capillary into the tee in accordance with instructions in paragraph 5-3e.
- (5) Connect the wire leads. See figure 4-7, wiring diagram.
- (6) Leak test the refrigeration piping in the area of the newly brazed joint in accordance with paragraph 5-3b.
- (7) Evacuate the system in accordance with paragraph 5-3c.
- (8) Charge the system in accordance with paragraph 5-3d.
- (9) Install the top, upper right and rear panels.
- (10) Connect power to the unit.

5-5. REFRIGERANT PIPING (BOTH SECTIONS)

For access, inspection of installed items, and testing, see paragraph 4-19 for condenser section piping, paragraph 4-43 for evaporator section piping.

a. Repair/Replacement.

WARNING

Disconnect power from the air conditioner before performing maintenance on internal components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- (3) Debraze the leaking or damaged joints in accordance with instructions in paragraph 5-3a.
- (4) If a fitting or section of tubing is defective, replace it.
- (5) Braze the tubing or fitting connections in accordance with instructions in paragraph 5-3a.
- (6) Leak test the refrigeration piping in the area of newly brazed joints in accordance with paragraph 5-3b.
- (7) Evacuate the system in accordance with paragraph 5-3c.
- (8) Charge the system in accordance with paragraph 5-3d.
- (9) Install outside panels.
- (10) Connect power to the unit.

aregraph 4-20 for inspection/test of installed items.

Replacement (figure 4-16).

WARNING

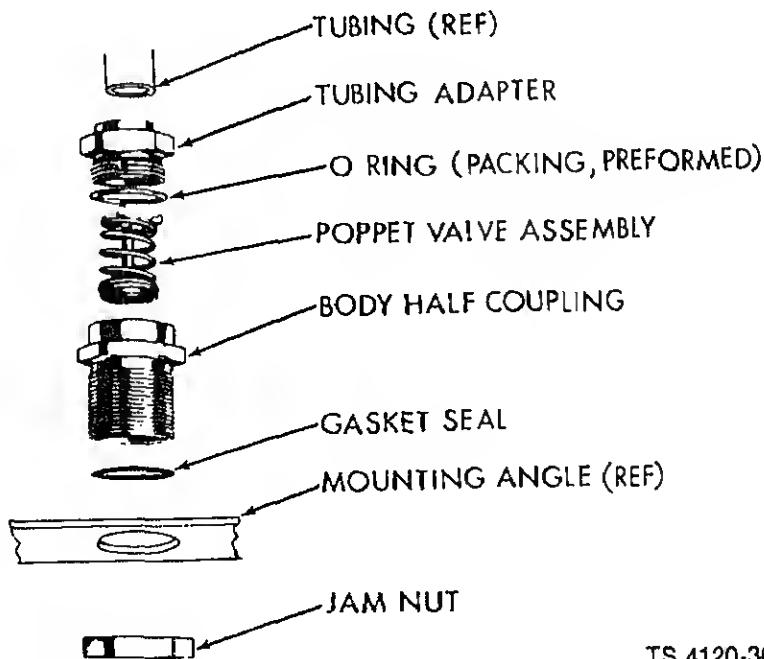
Disconnect power from the air conditioner before performing maintenance on internal components. The voltage used can be lethal.

- 1) Disconnect power.
- 2) Remove the rear panel.
- 3) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- 4) Loosen the flare nuts connecting the tubing to the service valve.
- 5) Remove the two screws and lock nuts holding the valve bracket.

HALF COUPLINGS (BOTH SECTIONS)

aregraph 4-21 for inspection of installed items.

Repair or Replacement. See figure 5-1. All repairs other than tightening of screw joints will require assembly and replacement of some parts. When the half couplings are disassembled for any reason O-rings and gaskets should be replaced.



- (2) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- (3) Remove the hose. Use two wrenches to avoid damage to the tubing connections. Use one wrench to hold the hex portion of the half coupling body located directly above the mounting angle on the unit and the other to loosen the hose assembly end. Take care to avoid kinking and excessive twisting of the hose.
- (4) Use two wrenches. Using one wrench to hold the valve body, remove the jamnut.
- (5) Use two wrenches. Using one wrench to hold the tubing adapter, carefully remove the valve body. Carefully spring tubing up enough to remove the half coupling body, the poppet valve assembly and the O-ring.
- (6) Inspect the tubing adapter for cracks and damaged threads. If defective, debraze the tubing adapter in accordance with instructions in paragraph 5-3e.

b. Installation. See figure 5-1.

- (1) If the tubing adapter was removed, braze a new one in place in accordance with Instructions in paragraph 5-3e.
- (2) Slip the poppet valve assembly and O-ring into place in the half coupling body. Carefully engage the threads of the half coupling body and the tubing adapter.
- (3) Use two wrenches. Use one wrench to hold the tubing adapter end and the other to tighten the half coupling body to approximately 35 foot pounds (47.8 newton meters) of torque.
- (4) Carefully slip the threaded portion of the half coupling body through the hole in the mounting angle. Hold the hex on the half coupling body in place with a wrench and tighten the jam nut.
- (5) Use two wrenches, one to hold the hex portion of the half coupling body located directly above the mounting flange on the unit, and the other to tighten the hose assembly end to approximately 35 foot pounds (47.8 newton meters) of torque.

CAUTION

Do not allow the fitting on the unit to turn. Avoid kinking or twisting the hose.

- (6) Leak test the refrigerant fittings and hose in the area of the newly installed half coupling and hose in accordance with paragraph 5-3b.
- (7) Evacuate the system in accordance with paragraph 5-3c.
- (8) Charge the system in accordance with paragraph 5-3d.
- (9) Install the hood.

8. COMPRESSOR (CONDENSER SECTION)

Refer to paragraph 4-22 for inspection of installed items, cleaning and testing.

Disconnect power from the air conditioner before performing maintenance on electrical components. The voltage used can be lethal.

Disconnect power.

Remove the intake air grille, the left side panel, the rear panel and the bottom grille. See figures 4-8 and 4-9.

Release the refrigerant in accordance with instructions in paragraph 5-3a.

Tag and disconnect the wire leads.

Debrazz the suction and discharge lines from the compressor in accordance with instructions in paragraph 5-3e.

Remove the hex head cap screw and lock washer that holds the top of the compressor to the removable frame angle.

Remove the two flat head screws that hold the removable frame angle to the frame and carefully pull the removable angle up slightly to free the top of the compressor.

Set the condenser section up on blocks or carefully sting so that the screws holding the mounting feet of the compressor are accessible.

Remove the four flat head screws, lock washers and nuts from the mounting feet of the compressor.

Carefully remove the compressor from the unit.

Check the compressor for indications of compressor motor burnout.

Burnout of a compressor motor is indicated by lack of continuity of the motor windings and the condition of compressor oil, which must be determined after the compressor has been removed from the refrigeration system. Causes of compressor motor burnout include the following:

- (a) Low line voltage, which causes motor windings to overheat. Before burning out completely, the overheated windings cause chemical breakdown of the refrigerant and the oil to form sludge and other system contaminants.
- (b) Loss of refrigerant. An inadequate charge of refrigerant gas in the system reduces the amount of cooling gas within the compressor, resulting in gradual overheating of the motor and failure of the winding.
- (c) High head pressure. High head pressures can be caused by clogged or dirty condenser coils or screens, or by an inoperative condenser fan. High head pressure requires the compressor to work harder, creating additional heat which ultimately can result in motor burnout. Poor ventilation around the condenser, and extremely high ambient temperatures can also cause motor failure.
- (d) Moisture in system. Leakage of air into the refrigeration system starts a chain reaction which can result in motor burnout. Air contains oxygen and moisture which combined with refrigerant gas form hydrochloric and hydrofluoric acids. These combine with compressor oil to form an acid sludge which is carried throughout the system, and which attacks the motor windings, causing short circuits and burnout.

these problems must be corrected or avoided to prevent repetition of the burnout. After removal of bad compressor from the refrigeration system, remove all external tubing and tip the compressor toward the discharge port to drain a small quantity of oil into a clear glass container. If the oil is clean and clear, and does not have an acrid smell, the compressor did not fail because of motor burnout. If the oil is black, contains sludge and has an acrid odor, the compressor failed because of motor burnout, and the refrigeration system must be cleaned to prevent residual contaminants from causing repeated burnouts when the compressor is replaced.

Runup procedure after a compressor motor burnout.

You must clean the entire refrigeration system after a burnout has occurred, since contaminants will have been carried to many corners and restrictions in the piping and fittings. These contaminants will soon mix with new refrigerant gas and compressor oil to cause repeated burnouts. To clean the system thoroughly, act as follows:

Remove the filter-drier, and blow down each leg of the refrigeration system. To do this, connect a cylinder of dry nitrogen to each filter-drier connection, in turn, and open the cylinder shutoff valve for at least 30 seconds at 50 psig (3.5 kg/cm²) pressure.

Connect the two filter-drier fittings with a jumper locally manufactured from refrigerant tubing and fittings.

Disassemble the expansion valve and temporarily remove the valve cage. Reinstall shell of power assembly, using a locally manufactured gasket between power assembly and body to prevent leakage. Tag and retain the valve cage for use at reassembly.

Connect the discharge line of the refrigerant system to the discharge side of a small diaphragm-type pump.

Connect a line containing a filter to the suction line in the unit.

NOTE

An unused filter-drier or other suitable medium may be used as the filter.

The other end of the temporary suction line should be connected to a small drum or suitable reservoir.

A line should be run from the bottom of the reservoir to the inlet of the pump.

WARNING

Be sure there is adequate ventilation during this procedure.

Fill reservoir with fluorocarbon refrigerant, R-11, and start the pump. Continue filling the reservoir with refrigerant, R-11, until it begins to pour out of the return line. Continue flushing for at least 1 minute.

Reverse the pump connections, replace the filter with a new filtering medium, and backflush the system for an additional 15 minutes.

valve and reinstall the valve cage. Install new gaskets and assemble

(13) Disconnect the dry nitrogen cylinder and immediately install a new filter-drier, making sure that direction-of-flow arrow points toward the sight glass. Cap or plug compressor connection compressor is not to be installed immediately.

Installation. See figure 4-16.

- (1) Carefully place the compressor in the unit and mount to the frame using four each flat head screw lock washers and nuts.
- (2) Move the removable frame angle down and install the two flathead screws that attach the ends of angle.
- (3) Attach the top mounting point of the compressor to the removable angle using a hex head cap screw and lock washer.
- (4) Braze the suction and discharge lines to the compressor in accordance with instructions paragraph 5-3e.
- (5) Connect the wire leads. See figure 4-7, wiring diagram.
- (6) Leak test the refrigeration piping in the area of the newly brazed joint in accordance with paragraph 5-3b.
- (7) Evacuate the system in accordance with paragraph 5-3c.
- (8) Charge the system in accordance with paragraph 5-3d.
- (9) Install the intake air grille, left side panel, rear panel and the bottom grille.
- (10) Connect power to the unit.

SIGHT GLASS (CONDENSER SECTION)

paragraph 4-27 for inspection/test of installed items.

Replacement (figure 4-16).

- (1) Remove the intake air grille. See figure 4-8.
- (2) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- (3) Loosen the flare nuts connecting the tubing and filter-drier to the sight glass and remove the sight glass.

Installation. See figure 4-16.

- (1) Connect and tighten the flare nuts to the sight glass.
- (2) Leak test the valve and newly connected tubing in the area of the valve in accordance with paragraph 5-3b.

The filter-drier assembly is a metal container which contains dehydrating and filtering media through which liquid refrigerant must flow. A new filter-drier must be installed in the refrigerant system whenever it has been opened. See figure 4-16.

a. Replacement.

- (1) Remove the intake air grille. See figure 4-8.
- (2) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- (3) Remove the screw, clamp and lock nut that support the filter-drier.
- (4) Loosen the flare nuts connecting the tubing and the sight glass to the filter-drier. Remove the drier from the unit.

b. Installation. See figure 4-16.

- (1) Connect and tighten the flare nuts to the filter-drier.
- (2) Install the clamp that supports the filter-drier with a screw and lock nut.
- (3) Leak test the valve and newly connected tubing in the area of the valves in accordance with paragraph 5-3b.
- (4) Evacuate the system in accordance with paragraph 5-3c.
- (5) Charge the system in accordance with paragraph 5-3d.
- (6) Install the intake air grille.

5-11. RECEIVER (CONDENSER SECTION)

See paragraph 4-28 for inspection/test of installed items.

a. Repair or Replacement. See figure 4-16.

- (1) Remove the intake air grille and the bottom grille. See figures 4-8 and 4-9.
- (2) Release the refrigerant in accordance with instructions in paragraph 5-3a.
- (3) Remove and examine the fusible plug located in the end of the receiver. If this plug is broken, replace it with a part number P580-STL (78857) or another fusible plug.
- (4) Examine the receiver. If there is no other damage, skip steps a-4 thru b-4. If the receiver continues with step 5.
- (5) Braze the inlet and outlet tubes to the receiver in accordance with instructions in paragraph 5-3b.
- (6) Remove the four flat-head screws and the two receiver mounting brackets.
- (7) Carefully slip the receiver out of the unit.

b. Installation. See figure 4-16.

Evacuate the system in accordance with paragraph 5-3c.

Charge the system in accordance with paragraph 5-3d.

Install the Intake air grille and the bottom grille. See figures 4-8 and 4-9.

CONDENSER COIL

Graph 4-29 for Inspection/test of installed items and cleaning.

psir or replacement. See figure 4-16. If the inspection/test results indicate only a leak in a return tube connection, perform only those steps necessary to repair the defect and skip to step b-3. Perform the remaining steps that are necessary.

WARNING

Disconnect power from the air conditioner before performing maintenance on internal components. The voltage used can be lethal.

Disconnect power.

Remove the following grilles and panels: discharge air grille, right upper louvered panel, louvered panel and the rear panel.

Release the refrigerant in accordance with Instructions in paragraph 5-3e.

Tag and disconnect all electrical leads to the motor and items mounted on the condenser shroud.

Remove the four screws that attach the motor mounting brackets to the frame. Remove the motor fan assembly from the unit.

Remove two flat head screws and carefully pull the pressure switch and bracket assembly up out of the way of the work area.

Remove eight each screws and lock washers and carefully remove the fan shroud.

Debrace the inlet and outlet tubes to the condenser in accordance with Instructions in paragraph 5-3e.

Remove six flat head screws and carefully remove the condenser coil from the unit.

Installation. See figure 4-16.

Carefully position the condenser coil in the unit and attach it to the frame with six flat head screws.

Fit the tubing to the inlet and outlet connections on the condenser coil and brace the joints in accordance with Instructions in paragraph 5-3e.

Leak test the refrigeration piping in the area of the newly braced joints in accordance with Instructions in paragraph 5-3e.

Charge the system in accordance with paragraph 5-3d.

Carefully position the condenser fan shroud on the coil flange and attach it with eight each screw and lock washers.

Install the fan and motor assembly with four flat head screws. Check the fan for clearance by spinning the fan by hand. Clearance between the blade tips and fan shroud should be even. If necessary loosen the screws and adjust.

Install the pressure switch and bracket assembly with two flat head screws.

Connect the electrical leads that were disconnected from the motor and items mounted on the condenser fan shroud. See tags on removed electrical leads and see wiring diagram, figure 4-7.

) Install the following grilles and panels: discharge air grille, right upper louvered panel, left louvered panel and the rear panel.

) Connect power to the unit.

EXPANSION VALVE (EVAPORATOR SECTION)

Graph 4-17 for inspection/test of installed items.

justment. The expansion valve, as supplied with the unit, is preset at the factory. This valve should not be adjusted unnecessarily. When adjustment is necessary, see the following instructions:

Remove insulation from a spot on the suction line near the sensing bulb of the thermal expansion valve to be adjusted.

Install an accurate thermometer or the probe of a thermocouple on the bare spot, using a small amount of the thermal mastic, if available, to improve conductivity. Tape the thermometer bulb or thermocouple junction in position, and cover with insulating material.

Remove the left louvered panel from condenser section. See figure 4-9.

Connect a suitable pressure gage to the service valve and open the valve. See figure 4-16.

Operate the air conditioner in the cooling mode for about 30 minutes, observing the thermometer or thermocouple dial to see that the temperature has stabilized. When the temperature remains unchanged for at least two minutes, record the temperature and pressure.

Compare the recorded temperature and pressure with those in Table 5-1. The temperature measured should register approximately 5°F (2.8°C) higher than the temperature listed on the Table.

If adjustment is necessary, remove the cap from the expansion valve and turn the adjusting stem counterclockwise to decrease the superheat and clockwise to increase the superheat. When adjusting the valve, make no more than one turn of the stem at a time and observe the change in the superheat closely to prevent overshooting the desired setting. Allow unit to stabilize before taking reading.

When the proper setting is obtained, replace the cap on the valve adjusting stem.

Remove the thermometer or thermocouple probe from the suction line, and replace the insulating material. Close the suction service valve, remove the pressure gage, and install the cap on the valve.

Temperature		Pressure		Tempsreture		Pressure	
F	Deg C	psig	kg/cm ²	Deg F	Deg C	psig	kg/c
-12.3	14.64	1.029	66	18.9	65.03	4.57	
-11.1	15.84	1.113	88	20.0	87.58	4.76	
-10.0	17.08	1.200					
-8.9	18.36	1.291	70	21.1	70.19	4.93	
-7.8	19.68	1.384	72	22.2	72.86	5.12	
			74	23.3	75.60	5.31	
-6.6	21.04	1.479	76	24.4	78.39	5.51	
-5.5	22.44	1.578	78	25.6	81.25	5.71	
-4.3	23.88	1.679					
-3.4	25.38	1.783	60	26.7	84.17	5.91	
-2.2	26.88	1.890	82	27.8	87.18	8.12	
			84	28.9	90.22	6.34	
-1.1	26.45	2.000	86	30.0	93.34	8.56	
0	30.06	2.113	88	31.1	96.53	8.76	
1.1	31.72	2.230					
2.2	33.42	2.349	90	32.2	99.79	7.01	
3.3	35.17	2.472	92	33.3	103.12	7.24	
			94	34.5	106.52	7.48	
4.4	36.97	2.599	96	35.6	110.00	7.73	
5.5	36.62	2.729	96	36.7	113.54	7.98	
6.6	40.71	2.662					
7.7	42.66	2.999	100	37.8	117.18	6.23	
8.8	44.65	3.139	102	38.9	120.86	6.49	
			104	40.0	124.83	8.76	
10.0	46.70	3.283	106	41.1	128.48	9.03	
11.1	48.80	3.431	108	42.2	132.41	9.30	
12.2	50.95	3.562					
13.3	53.18	3.737	110	43.3	138.41	9.55	
14.5	55.42	3.896	112	44.4	140.49	9.87	
			114	45.6	144.66	10.11	
15.8	57.74	4.019	116	46.7	148.91	10.46	
16.7	60.11	4.226	118	47.8	153.24	10.77	
17.8	62.54	4.397					

WARNING

Disconnect power from the air conditioner before performing maintenance on internal components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Remove the right side and back panels.

- (2) Slip the thermal bulb into the clamp on the suction line. Make sure that bulb is aligned with the suction line. Tighten clamp and tape insulation back in place.
- (3) Leak test the valve end newly connected tubing in the area of the valve in accordance with paragraph 5-3b.
- (4) Evacuate the system in accordance with paragraph 5-3c.
- (5) Charge the system in accordance with paragraph 5-3d.
- (6) Install the right side and back panels.
- (7) Connect power to the unit.

5-14. EVAPORATOR COIL

See paragraph 4-47 for inspection/test of installed items and cleaning.

- a. Repair or replacement. See figure 4-33. If the inspection/test results indicate only a leak or tube connection, perform only those steps necessary to repair the defect and skip the remainder of this section.

WARNING

Disconnect power from the air conditioner before performing maintenance on components. The voltage used can be lethal.

- (1) Disconnect power.
- (2) Remove the following outside panels: front, right side, lower left side back, bottom back.
- (3) Release the 1/4 turn fasteners and carefully pull the control panel out far enough to access the evaporator coil.
- (4) Loosen the screws holding the thermostat sensing bulb clamps and remove the clamps.
- (5) Carefully pull the sensing bulb from around the end of the evaporator coil and remove the control panel.
- (6) Pull the control panel out of the way, taking care not to damage the harness or the cable.
- (7) If the heaters have been in operation, let the unit cool down.
- (8) Tap end disconnect the electrical leads to the heater and thermostat.
- (9) Remove four each screws and lock washers and remove the heater and thermostat.
- (10) Slide the air filter up and out of the side clips on the coil.
- (11) Release the refrigerant in accordance with instructions in paragraph 5-3e.

Remove two screws and carefully remove the two sheet metal thermostat bulb clamps.

Remove four flat heat screws and carefully rotate the evaporator coil and remove the coil from the bottom of the unit. Retain the old coil to use as a sample for forming of distributor lines and location of insulated surfaces. The distributor and flare nut assembly are to be reused.

Installation. See figure 4-33.

Coat the mating surfaces of the coil and insulation with adhesive. Let both surfaces air dry until the adhesive is tacky but will not stick to the fingers. See figure 4-33 and old coil for location of insulation surfaces.

Starting with an end, carefully attach the insulation to the metal. Press to a firm contact all over.

Carefully form the distributor lines using the old coil as a sample.

Remove the distributor and flare nut assembly from the old coil and braze to distributor lines in accordance with paragraph 5-3e.

Carefully position the evaporator coil through the bottom of the unit and attach it to the frame with four flat head screws.

Fit the removed lines to the connections on the evaporator coil and the half couplings.

Braze the line joints in accordance with instructions in paragraph 5-3e.

Connect the flare nut to the expansion valve.

Leak test the refrigeration piping in the area of the newly assembled joints in accordance with paragraph 5-3b.

Evacuate the system in accordance with paragraph 5-3c.

Charge the system in accordance with paragraph 5-3d.

Carefully slide the filter into the side clips located on the upper side of the evaporator coil.

Install the two sheet metal thermostat bulb clamps using two screws.

Install the drain pan using four flat head screws.

Carefully mount the heater assembly to the evaporator coil flange using four each screws and lock washers.

Connect the electrical leads. Refer to the tags added when wires were removed and see the wiring diagram, figure 4-7.

Carefully form the sensing bulb capillary line around the end of the evaporator coil and install the bulb in the clamps and tighten the screws.

Reposition the control panel and engage the 1/4 turn stud fasteners.

See paragraphs 4-30 and 4-48 for access, inspection of installed items, and installation of outside

a. Repair.

- (1) Straighten all bent, twisted or dented frame members using conventional sheet metal methods.
- (2) Repair and reweld all cracked or broken welds.



Take care not to damage any components, wiring or piping when making repairs on frame.

b. Painting. Should touch up or refinishing be necessary, see TM43-0139.

REFERENCES

1.	FIRE PROTECTION	
	TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users
2.	LUBRICATION	
	C91001L	Fuels, Lubricants, Oil and Waxes
3.	PAINTING	
	TM 43-0139	Painting Instructions for Field Use
4.	MAINTENANCE	
	TM 38-750	The Army Maintenance Management System (TAMMS)
	TM5-4120-362-23P	Organizational and Direct Support Maintenance Repair Parts and Special Tools List
5.	CLEANING	
	Fed. Spec P-D-680	Dry cleaning solvent
6.	DESTRUCTION	
	TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use
7.	SHIPMENT AND STORAGE	
	TM 740-90-1	Administrative Storage of Equipment
8.	RADIO SUPPRESSION	
	TM 11-483	Radio Interference Suppression

1

Section I

INTRODUCTION

Ganeral

This section provides a general explanation of all maintenance and repair functions authorized across various maintenance levels.

The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

Section III lists the special tools and test equipment required for each maintenance function referenced from Section II.

Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

Maintenance Functions

Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, compressed air supplies.

Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting operating characteristics to specified parameters.

Tune. To adjust specified variable elements of an item to bring about optimum or desired performance.

Calibrate. To determine and cause corrections to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

Install. The act of placing, seating, or fixing into position an item, part, or module (component assembly) in a manner to allow the proper functioning of an equipment or system.

Replace. The act of substituting a serviceable like type part, subassembly, or module (component assembly) for an unserviceable counterpart.

Repair. The application of maintenance services (inspect, test, service, adjust, tune, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, surfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, failure in a part, subassembly, module (component or assembly), and item or system.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to like new condition in accordance with original manufacturing standards. Rebuild is the highest level of material maintenance applied to Army equipment. The rebuild operation includes the act of removing zero those age measurements (hours/miles, etc.) considered in classifying Army components.

B-3. Column Entries

Columns used in the maintenance allocation chart will be limited to those shown. Entries for those columns explained below.

- a. **Column 1, Group Number.** Column 1 lists group numbers, the purpose of which is to identify assemblies, subassemblies, and modules with the next higher assembly.
- b. **Column 2, Component/Assembly.** Column 2 contains the noun names of components, subassemblies, and modules for which maintenance is authorized.
- c. **Column 3, Maintenance Functions.** Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)
- d. **Column 4, Maintenance Level.** Column 4 specifies, by the listing of a "work time" figure in minutes, the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform the maintenance function at the lowest level of maintenance. If the number or complexity of the tasks within the listed maintenance function require different maintenance levels, appropriate "work time" figures will be shown for each level. The letter designations for the various maintenance levels are as follows:

C Operator or crew
O Organization maintenance
F Direct support maintenance
H General support maintenance
D Depot maintenance

- e. **Column 5, Tools and Equipment.** Column 5 specifies, by code, those common tool sets (kits) and special tools, test, and support equipment required to perform the designated maintenance function.
- f. **Column 6, Remarks.** Column 6 contains a letter code in alphabetical order which shall be used in remarks contained in Section IV.

B-4. Column Entries Used in Tool and Test Equipment Requirements

- a. **Column 1, Tool or Test Equipment Reference Code.** The tool and test equipment reference code relates with a maintenance function on the identified end item or component.
- b. **Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
- c. **Column 3, Nomenclature.** Name or identification of the tool or test equipment.
- d. **Column 4, National/NATO Stock Number.** The National or NATO stock number of the tool or test equipment.

B-5. Explanation of Columns in Section IVa. **Reference Code.** The code scheme recorded in column 6, Section II.b. **Remarks.** This column lists information pertinent to the maintenance function being performed on the MAC, Section II.**APPENDIX B**
Section II
MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools & Equipment	P	
			C	O	F	H	D			
01	ELECTRICAL CABLE AND INTERCONNECT- ING HOSES	Inspect								
		Test	0.5							
		Repair	0.5							
		Replace	1.0							
02	CONDENSER SECTION	Test								
		Repair	0.2							
		Replace	0.2							
		Test	0.4							
03	REFRIGERANT SYSTEM	Test								
		Repair	0.3							
		Replace	0.5							
		Test	0.5							
04	REFRIGERANT COMPRESSOR SECTION	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
05	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
06	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
07	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
08	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
09	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
10	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
11	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
12	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
13	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
14	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
15	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
16	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
17	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
18	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
19	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
20	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
21	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
22	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
23	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
24	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
25	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
26	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
27	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
28	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
29	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
30	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
31	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
32	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
33	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
34	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
35	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
36	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
37	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
38	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
39	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
40	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
41	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
42	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0.5							
		Replace	0.5							
		Test	0.5							
43	REFRIGERANT COOLING SYSTEM	Test								
		Repair	0							

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tool/ Equipm
			C	O	F	H	D	
03	Motor, Condenser Fan	Test Replace	0.2	1.0				
	Pressure Switch	Test Replace	0.3		8.0			
	Rectifier	Test Replace	0.3	1.0				
	Refrigerant Piping	Test Repair	1.0		8.0			
	Valve, Service	Test Replace	0.2		8.0			
	Coupling Helfs	Test Repair Replace	0.2		8.0	8.0		
	Compressor	Test Repair Replace	0.3		8.0	14.0		
	Capecitors	Test Replace	0.3	1.0				
	Switches Relays	Test Replace	0.3	1.0				
	Sight glass	Inspect Replace	0.3		8.0			
	Drlr	Replace			8.0			
	Receiver	Inspect Replace	0.3		8.0			
	Coil, Condenser	Test Repair Replace	1.0		4.0	10.0		
	Freme	Inspect Repair	1.0		4.0			
	EVAPORATOR SECTION							

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools & Equipment	(6) Remarks
			C	O	F	H	D		
	Electrical Wiring	Test Repair Replace	1.0 1.0 4.0						
	Switches	Test Replace	0.3 1.0						
	Damper Assembly and Control	Service Repair Replace	0.2 1.0 3.0						
	Fan, Evaporator	Test Replace	1.0 1.0						
	Motor, Evaporator Fan	Test Replace	0.2 1.0						
	Capacitor	Test Replace	0.3 1.0						
	Relay	Test Replace	0.3 1.0						
	Silicon Junction Rectifier	Test Replace	0.3 1.0						
	Refrigerant Piping	Test Repair Replace	1.0						
	Half Couplings	Test Repair Replace	0.2	8.0 8.0					
	Expansion Valve	Test Adjust Replace	0.3	8.0 8.0					
	Air Filter	Service Replace	0.3	4.0					
	Heating Unit	Test Repair Replace	0.3 0.5 1.0	8.0					
		Test Repair	1.0	8.0					

TOOLS AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NA Stock Num
		<p>No special tools and test equipment required. Standard tools and test equipment in the following kits are adequate to accomplish the maintenance functions listed in Section II:</p> <p>Tool kit, service refrigeration Unit (SC 5180-90-CL-N18)</p> <p>Soldering Gun Kit</p>	5180-00-597- 3439-00-930-

APPENDIX B

Section IV.

REMARKS MAINTENANCE ALLOCATION CHART

Reference Code	Remarks
	<p>No supplemental instructions or explanatory remarks are required for the maintenance functions listed in Section II. All functions are sufficiently defined in Section I. Active time listed for maintenance task functions are with the air conditioner in off-equipment position.</p>

Appendix lists Expendable Supplies and Materials you will need to operate and maintain the Air Corps. These items are authorized to you by CTA 50-970, Expendable Items (except Medical Class V, Radioactive and Heraldic Items).

EXPLANATION OF COLUMNS

Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material.

Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

Column 3 - National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.

Column 4 - Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

Column 5 - Unit of Measure (UM). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, e.g., each (ea), each (e), each (en), pair (pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) UM
1	F	9150-00-823-7905	Lub. Oil Ref. VV-L-825	GL
2	C	6850-00-264-9037	Dry Cleaning Solvent P-D-680 (81348)	GL
3	F		Dichlorodifluoromethane, Technical w/cylinder 22 lb Refrigerant -12 BB-F-1421, Type 12 (81348)	CY

nts, Initial
or
zational.

sembly, Interconnection
rs
assor Run.....
assor Start.....
nsar Fan Motor Run.....
ator Fan Motor Run.....
g, Raflgarant.....
Initial
or
zational.
ndensar.....

porator.....

sor.....

sor Run Capacitor.....
sor Start Capacitor.....
sor Start Ralay.....
er Coll.....

er Fan.....
er Fan Motor.....
er Fan Motor Run Capacitor.....
or, Electrical
Supply.....
ng Plug.....
Panal.....
, Oparator's.....
s, Half.....

C

Control Switch.....
tor.....

I Connactor
Supply.....
ng Plug.....
I Wirling
nsar Saction.....
rator Section.....
tor Coll.....

tor Fan.....
tor Fan Motor.....

D

E

Expansion Valve	F
Fan, Condenser	
Fan, Evaporator	
Filter, Air	
Filter-Drier	
Frame, Condenser Section	
Frame, Evaporator Section	
Fuse	
Grilles	G
Condenser Section	
Evaporetor Section	
Half Couplings	H
Heating Unit	
Hoods	
Condenser Section	
Evaporator Section	
Hoses, Refrigerant	
Installation	I
Interconnecting Ceble Assembly	
Leak Test	L
Louver, Fresh and Return	
Main Power Switch	M
Motor, Condenser Fan	
Motor, Evaporetor Fan	
Operating Procedure	O
Operetion In	
Cold, Extreme	
Dusty Arees	
Heet, Extreme	
High Altitudes	
Humid Conditions	
Reiny Conditions	
Salt Water Arees.	
Sendy Areas	
Operator's Controls	

P

, Control	.
s, Outside	.
ndenser Section	.
aporator Section	.
retion for	.
vement.	.
.....	.
rmance Data	.
g, Refrigerant	.
ndenser Section	.

aporator Section	.
------------------	---

er Relay	.
ure Switch	.

ontinue Maintenance Checks and Services

erator	.
ganizationel	.
cedures	.
erating	.
oae of Equipment	.

R

iver	.
ller	.
ller, Silicon Junction	.
gerant Hoses	.

gerant Piping	.
ndenser Section	.

aporator Section	.
------------------	---

y, Compressor Start	.
y, Power	.
ir Procedures Refrigeration System	.

S

tor Switch	.
ce Valve	.

Glesa	.
-------	---

on Junction Rectifier	.
oring	.
ge, Administrative	.
h, Demper Control	.
h, Main Power	.
h, Pressure	.

Switch, Selector	
Switch, Thermostatic Temperature Control	
T	
Thermostatic Temperature Control Switch	
Troubleshooting	
Operetor	
Organizational	
U	
Unpacking	
V	
Valve, Expansion	
Valve, Service	
W	
Wiring, Electrical	
Condenser Section	
Evaporator Section	

*or General, United States Army
The Adjutant General*

BUTION:
e distributed in accordance with DA Form 12-25C, Organizational Maintenance
ements for Environmental Equipment Air Conditioner, 6,000 BTU.

*U.S. GOVERNMENT PRINTING OFFICE: 1989--242-466/03755



THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

PFC JOHN DOE
COA, 3^d ENGINEER BN
FT. LEONARD WOOD MO 63108

PUBLICATION NUMBER

TN 5-4120-362-13

DATE

11 NOV 61

TITLE

Air Conditioner: Wall or base mounted 6,000 BTU/Hr Cool

EXACT...PIN-POINT WHERE IT IS

PAGE NO.

PARA-GRAPH

FIGURE NO.

TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinder.
31		4-3		Callout 16 on figure 4-3 is pointing at a <u>bolt</u> . In the key to fig. 4-3 item 16 is called a <u>shim</u> . Please correct one or the other.
25	line 20 4 PL 12			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-300. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN.

SIGNED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE:

John Doe

FILL IN YOUR
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

**OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300**

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTT
4300 Goodfellow Boulevard
St. Louis, MO 63120



THEN . . . JOT DOWN THE
DOPE ABOUT IT ON THIS
FORM. CAREFULLY TEAR IT
OUT. FOLD IT AND DROP IT
IN THE MAIL!

DATE SENT

LICATION NUMBER

TM 5-4120-362-13

PUBLICATION DATE

21 Nov 80

PUBLICATION TITLE

Air Conditioner: Wall or base
mounted 6,000 BTU/HR cooling

EXACT . . . PIN-POINT WHERE IT IS

GE

PARA-
GRAPH

FIGURE
NO

TABLE
NO

IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT:

FILL IN YOUR
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTT
4300 Goodfellow Boulevard
St. Louis, MO 63120

THEN. . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

OATESENT

ITION NUMBER
-4120-362-13

PUBLICATION DATE

21 Nov 80

PUBLICATION TITLE

Air Conditioner: Wall or base mounted 6,000 BTU/HR cooling

CT. PIN-POINT WHERE IT IS

**IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT**

NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

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St. Louis, MO 63120



THEN. . JOT DOWN THE
DOPE ABOUT IT ON THIS
FORM, CAREFULLY TEAR IT
OUT, FOLD IT AND DROP IT
IN THE MAIL!

DATE SENT

PUBLICATION NUMBER
TM 5-4120-362-13

PUBLICATION DATE
21 Nov 80

PUBLICATION TITLE
Air Conditioner: Wall or
base mounted 6,000 BTU/HR Co

THE EXACT PIN-POINT WHERE IT IS

**IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT:**

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE.

FILL IN YOUR
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

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Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTT
4300 Goodfellow Boulevard
St. Louis, MO 63120

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigram = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 10 kilograms = 220.48 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Square Measure

1 eq. centimeter = 100 eq. millimeters = .156 sq. inches
 1 eq. decimeter = 100 eq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. yards
 1 sq. dekameter (are) = 100 sq. meters = 1,076 sq. meters
 1 sq. hectometer (hectare) = 100 eq. dekameters = 100 sq. meters
 1 sq. kilometer = 100 sq. hectometers = .388 square miles

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .061 cu. inches
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 36.31 cu. yards

Approximate Conversion Factors

To change	To	Multiply by	To change	To
inches	centimeters	2.540	ounce-inches	newton-meters
feet	meters	.305	centimeters	inches
yards	meters	.914	meters	feet
miles	kilometers	1.609	meters	yards
square inches	square centimeters	6.451	kilometers	miles
square feet	square meters	.093	square centimeters	square inches
square yards	square meters	.838	square meters	square feet
square miles	square kilometers	2.590	square meters	square yards
acres	square hectometers	.406	square kilometers	square miles
cubic feet	cubic meters	.028	square hectometers	acres
cubic yards	cubic meters	.765	cubic meters	cubic feet
fluid ounces	milliliters	29.573	cubic meters	cubic yards
pints	liters	.473	milliliters	fluid ounces
quarts	liters	.948	liters	pints
gallons	liters	3.785	liters	quarts
ounces	grams	28.349	grams	gallons
pounds	kilograms	.454	kilograms	ounces
short tons	.907	metric tons	pounds	
pound-feet	newton-meters	1.365	metric tons	short tons
pound-inches	newton-meters	.11375		

Temperature (Exact)

°F	Fahrenheit temperature	6/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----